COMPUTERWORLD

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User Gain: More Viable Vendors

NCR, CDC Launch Joint Venture

By E. Drake Lundell Jr.
Of the CW Staff

NEW YORK – NCR and Control Data announced a joint venture last week, including the establishment of a joint peripherals manufacturing company and plans for the design of a full range of compatible mainframes.

The "cooperative effort for the development of future central processing units" is designed to give the firms the "economies of scale" needed to compete effectively and serve present and future users, the companies said.

Corporate Identity

While the agreement calls for a joint peripherals manufacturing firm and a full range of compatible mainframes, each firm will retain its corporate identity and its own marketing and field support staffs.

Industry sources said the move appears to be the best combination of the recent three – Honeywell-GE, RCA-Univac and NCR-CDC – since each will continue to serve its specialized market.

The move is a clear attempt of the two to reinforce their commitment to the computer business. By sharing hardware and software development costs, they will be in a better financial position to serve computer users.

The commitment of the manufacturers other than IBM to the computer business has been severely questioned in the past two years, since both GE and RCA dropped out of the business.

The abrupt exit of RCA left a particularly bitter taste in the mouths of users, who questioned the ability of any firm other than IBM to stay in the business.

Besides reinforcing the commitment of the two to the computer business, the move apparently won't have a great deal of effect on users of the firms' equipment.

The reaction of several NCR users surveyed by *Computerworld* was primarily one of "wait and see." Most said they would not be upgrading their installations in the near future and therefore would not need more powerful computers than they have at the present.

One, however, was enthusiastic. "If the machines are truly compatible with the present NCR 315," he said, "I think we would definitely upgrade to a large-scale system like CDC makes in three or four years."

Move Outlined

The computer mainframe development program will "achieve a high degree of compatibility through the use of similar architectural concepts and related software," the firms said.

"As a part of this effort NCR will develop and produce a computer to serve as a swing processor to bridge the two computer lines," the announcement said.

The swing processor will be designed to operate in three modes: totally NCR, totally CDC, and emulation of other manufacturers' systems.

Under the agreement, NCR will develop and produce the lower and medium por-

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D.C. Has DP on Its Mind These Days

Congress Set to Debate Privacy, Credit Reporting

By a CW Staff Writer

WASHINGTON, D.C. – Privacy and problems with credit reporting systems will again head the list of computer-related topics to be debated during the upcoming congressional session.

Almost all of the issues facing the second session of the 92nd Congress are left over from the first session – or before – but the debate promises to be sharper as Democrats and Republicans jockey for positions that will grab voter attention and headlines in an election year.

And President Nixon has added another issue – the application of technology, in particular, computer technology – to the domestic issues facing the nation.

A new project which the President alluded to in his State of the Union Message, will probably be called the New Technology Opportunity program and will be designed to develop ways to apply computers to pollution problems, crime control, consumer protection, better transportation and innovations in education.

As such, the program could become a major part of the President's reelection platform, billed as a strong domestic measure. Naturally, the program will probably face some tough opposition from the Democratic senators seeking to replace Mr. Nixon in the White House.

The privacy issue will again get a thorough airing in Congress with two old foes of data banks and proponents of individual privacy active – Sen. Sam J. Ervin (D-N.C.) and Rep. Cornelius Gallagher (D-N.J.).

In releasing a report of hearings before the Senate

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Bigger Watchdog Role A 'Must' for Government

By a CW Staff Writer

WASHINGTON, D.C. – The Federal Government will play a more active role in monitoring and controlling computer applications, if it adopts the recommendations of a recent report prepared for the President's Office of Science and Technology.

"It seems imperative that national policy be formulated and implemented to guide the development and control the impacts of computer technology in directions most beneficial to our society," according to the study performed by the Mitre Corp.

The study, part of a governmental program to assess the impact that computers will have on future society, notes that "computers probably have had as great an impact on our society as any other technical innovation of the past quarter century.

More Salient Impact

"In the future," it says, "computers and communications will have an even more salient impact on our society and in a major way will affect such areas as economics . . . values, goals and priorities, the social issues; and institutional, political, legal and demographic areas."

The advances in computer technology predicted by the study over the next decade will permit a significant increase in the "quality and quantity of health service, education and administration of justice," the report says.

However, it warns, "if sufficient attention to problems such as security and privacy is not forthcoming, then these same

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Carriers Find No Actual Harm Without DAAs

By Ronald A. Frank
Of the CW Staff

WASHINGTON, D.C. – AT&T has told the Federal Communications Commission it cannot cite specific instances of harm caused to the telephone network by the direct interconnection of customer-provided equipment.

The Bell System response, together with letters from Western Union, GTE Service Corp., United Utilities and other carriers, was written after the FCC Common Carrier Bureau asked for details concerning harm caused by interconnected devices.

Current interconnection tariffs require the installation of telephone company connecting arrangements including Data Access Arrangements (DAAs) for communications lines. These units are designed to protect the phone network against four types of harm originally defined by the National Academy of Sciences (NAS) study group.

Potential Harm

The four types of potential harm de-

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On the Inside

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DP in Vietnam: A Multilingual Environment

By Bernice Pantell
Special to Computerworld

SAIGON – Computers first came into vogue in Saigon in 1964, when the Bureau of the Budget installed a tape 1401 system with the assistance of IBM France. The Vietnamese wrote their programs in Autocoder, using French-language manuals and Vietnamese-language forms. They are still doing so today, although IBM has since transferred to American hands.

Obviously, the presence of IBM in Vietnam had much to do with the interest in computers. The company has been here since 1937, starting out in Hanoi and coming south in 1946, after World War II.

IBM now operates a data center in Saigon with a 360/40 64K, 2314 disk system. The number of customers served is a company secret, but it is believed there are at least 15 customers, private and governmental.

DP and Drinking

Another major computer installation is the local beer and soft-drink company, BGI. BGI is a French firm that has been continuously operating in South Vietnam for 100 years. Today the firm has a 360/20 disk system with the first on-line terminal in commercial use in Vietnam.

The terminal is in the computer room because communication lines are not yet advanced enough to permit a remote operation.

The firm also has a multilingual environment. The data comes into the keypunch section on forms printed and filled out in Vietnamese. The operators follow keypunch instructions written in French.

Console instructions are also in French, but the programs are written in RPG and Assembly Language, with a good deal of English involved. Reports are printed in French or Vietnamese.

This multilingual environment is prevalent in all computer installations in Vietnam. There are 10 installations in operation today, two more are due to start up this year, and three more are being considered.

They are all IBM computers, although observers predict growing interest in other manufacturers, especially from Japan. There is another software company, besides IBM, called Vietnam Computer Corp., (VNCC). It does not yet have its own computer but hopes to acquire one if licensing problems with the Vietnam Government can be worked out.

Australian Users Group Welcomes Computer Makers

By Bohdan O. Szuprowicz
Special to Computerworld

SYDNEY, Australia — Whatever the user's computer problems, the Australian Computer Users Association (Acua), can offer a sympathetic ear and advice in a "computers anonymous" environment.

Membership in this organization is open only to user groups of manufacturers, banks, government agencies, software houses and insurance companies as well as some qualified consultants in the management and accounting specialities. Acua welcomes any computer user, whatever his machine may be.

T.A. Johnston, manager of the Management Systems Division at Australian Gas & Light Co., is Acua president. He denies that Acua may develop into a "computer lobby" for the Australian powers that be or that it intends to become a pressure group to keep computer manufacturers in line. Rather he sees Acua as an interest group dedicated to examining possible improvements in the law relating to computer use in Australia and to offering advice to its member computer users.

The newly incorporated Acua has several working subcommittees preparing studies for the membership. These look into contracts between manufacturers and computer users, implications of unbundling and resulting rights of the user, effect of price changes in computer hardware on a previous user, software purchases and its limitations, rental of hardware and software leasing and financing contracts, data banks, information exchanges and the possibility of consortia to meet common computer needs.

The association began in 1966 as a result of a computer conference in Canberra, but it took a few years before the association received government approval and became registered in the State of New South Wales (Sydney) as a company limited by a guarantee.

The beginning of active operations by Acua last May was hailed by trade, financial and even popular press in Australia as an important development in the growth of Australian computing. The initial membership is up to 300 member organizations and additional members are expected to join because there are 1,200 installations in Australia, although many are operated by a single computer user organization.

Voting at meetings of the association is confined to a single vote from each member regardless of the number of representatives present from that organization. Additional safeguards prohibit these votes from being exercised by anyone else but the "accredited representative" of the user member.

'Observers'

Acua invites all computer manufacturers to become members of the association because it recognizes that each company is indeed a computer user as well as producer. But the voting power of such representatives is still on par with the other members and they may be called upon to explain moves by their companies. Nevertheless, most computer manufacturers are members and their representatives participate, although in many instances their role is mostly that of "observers."

In some areas the association will enter into the public domain by standing ready to offer advice to groups concerned with education or social implications of computers. It will also stimulate public interest in career opportunities associated with the industry.

In general, it is conceded there is not yet too much formalized knowledge about the use of computers and that too many piecemeal approaches are tried by individual users with resulting loss of efficiency and unnecessary high costs. There is another computer organization watching the interests of the service bureaus. The Australian Association of Computer Service Organizations (AACSO) began a few years ago without too much success.

Carriers Find No Actual Harm

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fined by the NAS include voltages dangerous to human life; incorrect signals of excessive amplitude or improper frequency; improper line balance; and incorrect network control signals.

Most experts agree such harm can occur in theory, but since there are no actual instances, the real need for connecting arrangements has not been proved.

Meanwhile, users with customer-provided equipment must pay monthly charges for DAAs. The Independent Data Communications Manufacturers Association has told the commission that the DAAs are unnecessary and cause an unfair burden for users.

Since the DAA and other connecting devices were designed to protect against the NAS-type harm, the FCC asked the carriers for specific examples.

"Data is not available in the detail or in the form which you have requested," AT&T told the FCC staff. "Accurate statistics on all harms from uncontrolled interconnection are not and may never be attainable," the AT&T letter said.

Western Union told the FCC staff that it has not found "any instances of harm attributable to customer-provided equipment being caused to the Western Union network." The carrier added that it intends to "make connection of customer-owned equipment . . . as simple as possible."

Future Plans

GTE Service Corp. said that it was unable to provide any data but it plans to develop such statistics in the future. United Utilities provided the commission staff with a breakdown of trouble reports which had occurred at sites with customer-provided equipment. But it said that the troubles did not apply directly to the types of possible harm defined by NAS.

The FCC staff is planning to pursue the matter, according to a staff source. It is possible that uniform methods will have to be devised to measure instances of harm, he said.

In a related move, the FCC staff announced that a new advisory group would be formed to develop standards for the interconnection of automatic answering units and dialers. It is possible that an additional group may be formed to study the interconnection of data equipment, an FCC staff member said.

CDC, NCR Forming New Company

(Continued from Page 1)

tions of the computer line, including the swing machine. Control Data will develop and produce the more powerful processors in the line.

The joint development will permit the firms to share "the substantial investment required to develop new products in the computer industry as well as permit both companies to benefit from the special technical and manufacturing strengths of each organization," according to R. Stanely Laing, chairman and president of NCR, and William Norris, chairman and president of CDC.

The agreement also calls for the establishment of an even an even split between the two firms for the development and manufacturing of most of the computer peripherals to be used in NCR and CDC computer systems.

The new firm, as yet unnamed, will have assets of over $50 million, the firms said, and will develop and manufacture punched card equipment, magnetic tape equipment and high-speed printers.

An additional part of the agreement involves close association of the two companies in the area of disk drives and low-speed printers which will not be supplied by the new peripherals company.

Under this part of the pact, NCR has agreed to purchase all of its disk drives from Control Data and Control Data will buy its requirements in the low-speed printer market from NCR.

As part of this move, Control Data will purchase NCR's disk product line and manufacturing facility at Hawthorne, Calif.

The firms emphasized the move was not a merger in toto.

"Under the agreement both companies will retain their separate corporate identities and full independence in the market place, continuing to serve their chosen market and pursuing their own independent market strategies," the announcement said.

"Success in the general-purpose computer field in the years to come will demand not only extensive technical capabilities and a broad product line, but also the economies of scale in engineering and manufacturing operations and in software development which only sizable volume can provide," Norris and Laing said.

While the sudden move was not expected by most observers of the industry, NCR and CDC noted that they had had extensive OEM dealings over the past few years. It was also known that the two began some talks about a joint arrangement almost two years ago [CW, June 24, 1970].

The cooperative arrangement between NCR and Control Data will give the joint venture a 6.6% share of the industry's revenues, according to the 1971 figures.

The agreement has received the approval of the boards of each company and does not require stockholder approval to become effective. The Justice Department has already approved the pact between the two.

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Active Watchdog Needed

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advances can potentially change the character of our life style and the quality of life in a very profound and unfavorable manner."

To monitor and project the impact of computers in such areas as security and privacy, employment, etc., the report recommends the establishment of a "nucleus planning and analysis group . . . for the technological assessment of computers and their variety of complex impacts. This group would be the focal point and pivotal element for a continuing research, development and monitoring program in this area."

Societal Impact

The group would "conduct and integrate the planning and analysis of specific long-range programs" designed to determine the effects that computers will have on society at large.

While many government agencies are involved in some investigations of the use of computers, the report underlines that "there is a significant need for the ordering of priorities which is an extremely difficult problem and can only be rationally attempted through the 'systems approach' rather than any piecemeal effort."

Specific areas that should be studied, according to the study, include:

- **Employment.** "An in-depth investigation of the computer's impact on employment . . . would include a monitoring system for the employment-unemployment situation and automation. On the one hand, some forecasts indicate between one and two million workers will be employed in the computer-information industry by approximately 1975; on the other hand, other projections indicate that in the decade of the 1980s significant automation may reduce the labor force in present industry by 50% and, in addition, some forecast automation impacting upon the computer industry itself.
- **Privacy.** "Solutions, both technical and legal, must be found and implemented to lessen the problems of security and privacy . . . in order that overall policy may be formulated soon. The security/privacy problem can be controlled adequately if proper legislation and policy decisions are implemented and the problem is considered in the initial planning stages." The study recommends both technical and legislative solutions to the problem for further investigation.
- **Copyrights and Patents.** "The copyright and patent problem for computer-based information systems should be subject to further investigations – both legal and technical."
- **Experimentation.** "Large-scale experiments in application of computers should be performed through the interaction of information technology organizations/agencies and mission-oriented organizations/agencies. These experiments should produce relevant information in regard to the direction of further developments in computer technology both from the point of view of policy and science."
- **Education.** "A plan for a continuing educational program for both the application of computers and their fundamental concepts for all age groups should be devised . . . a better informed citizenry will be in a much better position to protect their rights in regard to such issues as security/privacy."
- **Policy Problems.** "The specific organizational and policy implementation problems of the control and guidance of computer-based impacts should be addressed. What has sometimes been referred to as the 'computer problem' is not really a single problem but a spectrum of present and potential problems . . ."
- **Networks.** "Both a computer-based network or subnetwork and a major data bank should be implemented for the purposes of technological assessment in general and specifically for the purpose of a technological assessment of computer-communications and their complex impacts."

News Wrapup

RCA Users Have Some Questions

ATLANTA, Ga. – RCA computer users will have another chance to voice their demands at the national meeting of the RCA Computer Users Association (RCA CUA) this week.

The questions the RCA CUA expects answered are the same ones it posed last October to RCA President Anthony Conrad. At that time the users demanded a presentation at the group's San Francisco meeting that would explain company policy on computer hardware maintenance support, deliveries of equipment now on order, etc.

Now, at Atlanta, the organization is expecting answers from Univac.

Univac has asked some users to give it until April 1 to get its organization set up.

County Aims for Quick Court Scheduling

LOS ANGELES – The second step in a multiphased effort to speed case processing in the San Bernardino County Municipal Court with the aid of computer simulation is underway. Work has begun under a $55,000 contract to test new Municipal Court case scheduling methods.

The project, funded by a grant from the California Council on Criminal Justice, stems from recommendations made in a 1970 study by the Los Angeles-based consulting firm of Isaacs Associates, Inc. The original study documented the time lost on the part of witnesses and other court participants, and recommended several new approaches to scheduling to reduce the delays and lost time.

The project is a joint effort involving both consultant and county personnel. The county computer will be used to simulate a full year of case activity and the new scheduling methods will be tested against actual data collected in the court to see which methods provide the smoothest flow of cases.

Company to Monitor Medicaid Claims

NEW YORK – A commercial insurance company here has a system up and working to monitor its Medicaid payments.

The system – based on two IBM 360/50s at Group Health Inc. – has helped the firm reduce costs and catch fraudulent claims, according to Dr. George Melsher Jr., president.

The system stores records of doctors in the plan, recording their specialties, experience and the hospitals they use. If a claim does not fit the specialty – such as a brain surgeon performing a gall bladder operation – the record is flagged for investigation.

211 of 601 Applicants Pass RBP Exam

PARK RIDGE, Ill. – The Certification Council of the Data Processing Management Association announced that 211 of the 601 applicants passed the 1971 Registered Business Programmer examination held by the DPMA in October.

Held in over 100 test centers in colleges and universities in the U.S. and Canada, the exam was the second since its introduction in 1970.

The council recently voted to change the exam months from October to April to make it more convenient for applicants to prepare for the exam. Some applicants contended the October examination date came too soon after summer vacation.

The next RBP exam will be held April 29.

Surplus Computers to Bolster Indian Power

WASHINGTON, D.C. – A group of American Indians will soon receive two computers for training in careers in programming, operating and DP equipment maintenance.

The General Services Administration will deliver two surplus RCA 301 computer systems to the Bureau of Indian Affairs schools in Utah and Kansas. One computer is scheduled for installation at the Intermountain School in Brigham City, Utah, and the other at Haskell Junior College in Kansas.

The computer training course will be the first offered to Indian students by BIA. Initially, courses will be limited to training in the maintenance of DP equipment. As resources and manpower permit, courses in computer programming and operation will be added.

The object of this pilot program is to develop technically qualified Indians who can operate and maintain DP centers for Indian-owned enterprises run by various tribes.

Savings Bank Industry Plans Conference

BOSTON – More than 800 of the leading operations officers of the savings bank industry are expected to attend the 24th Annual Operations, Audit and Control Conference of the National Association of Mutual Savings Banks Feb. 6-9.

The program will spotlight the latest developments in savings bank automation, data processing, security, personnel and other phases of bank internal operations. The latest equipment, products and services used by savings banks will be exhibited at the industry's annual trade show.

'But Projections Were Only $747,000 Off'

SAN DIEGO – How about a state computerized reapportionment study for only $3,000? According to Lt. Gov. Ed Reinecke, California's study was about $747,000 less than the cost of drawing up plans estimated by the state Senate and Assembly, all of which were vetoed by Gov. Ronald Reagan.

The computer reapportionment of the state's legislative and congressional districts was conducted by Compass Systems, Inc. and submitted to the State Supreme Court.

Survey Finds Many Problems

New England Users Split on Quality of Data Services

By Dennis Goss
CW Correspondent

While many computer users dependent on the New England Telephone Co. for data communications services are loudly critical of these services, others say they are having no problems with lines or equipment and suggest that maybe the fault is not with the telephone company but with the user's staff.

W.L. Lindholm, an American Telephone and Telegraph Co. executive vice-president, recently singled out Boston as a problem area when discussing telephone service with the New York Society of Security Analysts. One nationwide time-sharing utility with offices in the Boston suburb of Waltham claims that the service is the worst in the country.

But a recent CW survey of customers in the Boston area and other sections of the five states covered by New England Telephone suggests that both Lindholm and the Waltham critic may not be entirely accurate.

In fact, opinion was almost equally divided on whether the company was doing a good job. Almost all agreed that the service from AT&T long lines was good.

The 50% who were critical of the service were much more vehement in their remarks. Many refused to believe anyone was receiving good service. Some suggested that the seemingly satisfied user was not telling the truth for fear of reprisals, but they never suggested what these reprisals might be. Others critical of service in general praised the telephone company in some areas of data communications.

Users who were satisfied with service simply reported no problems and suggested problems that do exist might be overcome by better understanding of New England Telephone, teaching one's work force how to deal with it, and training employees to recognize when a problem is the telephone company's and when it is not.

Service, the qualifications of New England Telephone service personnel and the quality of lines appear to be a local issue, completely dependent on the local exchange. One Wellesley, Mass., customer said his firm was having no trouble but added that its data communications facilities were in Cambridge, Mass., evidently a good service area.

A large user who has dealt with many Bell System companies pointed out the reaction to the telephone company would vary with dependence on it. Those with large communications networks would be more likely to have problems. But, the results of the survey do not substantiate this.

Keydata Corp. of Watertown, Mass., which says it is the nation's largest private time-sharing service using dedicated lines, was one of those satisfied with service. On-line Systems, of Wellesley, Mass., another time-sharing service, also had no complaints.

Another suggestion by a long-time user of telephone company service is that newer customers tend to have more troubles because they lack experience in dealing with the telephone company.

The whole issue might be cleared up by a quality-of-service study to be undertaken by Arthur D. Little, Inc., at the request of the Massachusetts Public Utilities Commission. John Verani, commission chairman, indicated that the study would include data communications. A spokesman for Arthur D. Little declined to say what type of questions would be asked data communications users and when the study would begin or conclude.

The major complaint throughout the area serviced by New England Telephone appears to be the lack of qualified service personnel. One person with a hunting trunk that has not worked since installation called the company's wiring people incompetent. "You call to report a problem, and the girl who takes the message does not understand it, so it never gets to the right party," another disgruntled communications engineer reported.

The second most frequent complaint concerned problems with the lines themselves. Those queried agreed that the problems were not in AT&T's long lines but in those leading there. Leased lines were preferred over dial-up lines. One customer in western Massachusetts advocated foreign exchange lines, pointing out its experience with all other lines had been "horrible."

Most of those with problems with the telephone company were located in more populated areas. The American Optical Co. in semirural Southbridge, Mass., reported no problems in its communications with facilities in Canada. Spokesmen for the University of Massachusetts at Amherst and Bowdoin College in Brunswick, Me., praised service, but Myron Curtis, director of Bowdoin's computer center, admitted that additional demand might put an undue burden on the local exchange.

Delays

The most vehement complaints were from customers in the Boston area, but they are not the only sufferers. A Worcester, Mass., manufacturer reports several problems including 40- to 50-second delays in data transmission and problems with incomplete dialing that cause its computer to print out error messages. The wasted time means the computer must be kept operating longer and personnel kept on the job longer, both at considerable expense.

What can be done to improve service? There is general agreement that the service people must be better trained, and equipment upgraded. A new tariff would appear to be acceptable if separate data communications lines were the result. Data going to long lines should not be transmitted over T carrier lines, thus avoiding distortion and degradation.

An identification system for data communications lines should be established, so that those unfamiliar with this equipment will leave it alone. A sharper division of data and voice divisions should be made within the telephone company, and it should sit down with its data communications customers to learn their business, perhaps with the Federal Communications Commission acting as overseer.

Election Year Heats Up Debate on DP-Related Topics

(Continued from Page 1)

last year [CW, Jan. 26], Ervin stated new legislation was needed to insure individual privacy and it is likely he will introduce legislation to this end early in this session.

Ervin's Subcommittee on Constitutional Rights also expects to complete a survey of government data bank operations during this session.

The privacy issue will come up in the House when it debates Gallagher's proposal to establish a Select Committee on Privacy, Human Values and Democratic Institutions [CW, Jan. 12].

While the vote on the committee will be close, it is likely the committee will be set up early in this session and that it will begin hearings on computer-based data banks and other issues before the session winds down this summer.

While Ervin and Gallagher have spotlighted the privacy issue in the past, if one of the major presidential candidates gets on the bandwagon in a big way, the attention is likely to be increased, both here in Congress and in the national media.

The issue of privacy – and government snooping – will also play a major role in the debate over Senate Bill 2546, which attempts to outline guidelines "to insure the security and privacy of criminal justice information systems."

In fact, this bill [CW, Jan. 12] may become a major political issue, since it is sponsored by the Justice Department and a conservative Republican senator, Roman Hruska of Nebraska.

Many of the present Democratic presidential hopefuls are already critical of the operation of the FBI and, since the bill is directed to that agency's Computerized Criminal History System, it should come up for some criticism.

And the split between the Law Enforcement Assistance Administration and the FBI over how such systems should be maintained will give the Democrats plenty of ammunition for their attack on this issue.

Credit Abuses 'Catchy'

Problems with computerized credit systems will also provide Democrats with a "catchy" issue, especially if it is not preempted by the President.

Sen. William Proxmire (D-Wis.) has already introduced legislation and held hearings on a measure to control "tricky billing practices" and would require a firm to investigate – manually – all complaints about computerized billing systems within 30 days.

The act will come before the full Senate this year and is expected to pass, but if it doesn't, the Federal Trade Commission could come up with administrative regulations of its own.

While it has yet to do so, there is also a strong possibility that the Nixon Administration may propose new legislation on such systems during this session of Congress.

The use of computers to solve domestic problems of pollution, transportation and education will be studied with proposals both from the Nixon Administration and the Democrats in Congress.

During the last session, Sen. Edmund Muskie (D-Me.) one of the Democratic presidential hopefuls, supported a Senate bill to create a National Environmental Center, which would apply computer and other technology to the problems of the environment.

The measure, which was passed by the Senate, seems to be the kind of effort that President Nixon will propose this year as part of the New Technology Opportunity program and it received bipartisan support in the Senate.

Much Debate

This year both the President and the Democrats will propose new measures that would use technology for health, education, and transportation applications. Since these programs will be a major part of the upcoming presidential campaigns they are expected to generate a great deal of debate.

It seems likely that the Democratic programs will rely largely on federal projects in research in these areas, while the President's program will provide more support of private research.

But the differences will be more on emphasis than on substance – no one is against the use of technology per se to help solve pressing social problems.

However, with the debate on the use of computers and other technology becoming politically acceptable, the use of computers is likely to get a closer look in this session of Congress than ever before.

Monopoly Problems

The use of computers won't be the only subject debated. The computer industry itself will come under scrutiny as both the Senate and the House debate tougher antitrust laws.

Sen. Fred Harris (D-Okla.) will push for action on his Concentrated Industries Act [CW, Oct. 20], which would call for the breakup of any firm that controls over 12% of the total sales of an industry.

And at the same time, Rep. Emanuel Cellar (D-N.Y.) will push for House action on his plan to establish an Office of Industrial Organization, designed to handle all antitrust matters. His bill would require the breakup of any corporation accounting for 50% of the annual sales in any market.

While neither Cellar nor Harris expect passage of their bills during this session, both will schedule hearings on the measures.

Since Democrats like to complain that the Republican party is favorable to "big business," it is assumed that many of the presidential hopefuls will join the congressional call for some form of tougher antitrust legislation, thereby focusing greater attention on the issue than it might otherwise have received.

Mismanagement and Overruns

Waste in government procurement of computer systems will also become an issue for the new session of the Congress.

Several reports from the Government Accounting Office in the past year have highlighted inefficient federal procurement of software and hardware, and mismanaged systems, such as the one in the Post Office [CW, Aug. 4].

With politicians trying to find issues to embarrass the administration, it is likely that the procurement – as well as the use – of computers will be examined closely.

And while no hearings have been scheduled yet, some observers here feel Rep. Jack Brooks (D-Texas) may hold sessions on the implementation of the Brooks Bill, which was established to make the government's computer procurement activities more effective.

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Special Report

Source Data Automation, Part I

Man/Machine Interface Source of Entry Problems

"Instead of Saving Labor Through...Computers, These Systems Actually Increased The Work Load for the Average User."

By Ronald A. Frank
Of the CW Staff

For 25 years users have laboriously fed their computers a steady diet of specially prepared input. Most users knew this was an unnecessarily expensive, cumbersome method of automating data. But users also found that continued efforts to solve the input problem by capturing the data at the source met with mixed results.

In the past few years, great strides have been made in source data automation. As improved systems are developed that automatically create machine-readable data at the point where it is originated, it is becoming more and more obvious that a common set of problems exist for many applications.

Most experts in the source data automation field agree that the problems have been long-since defined. And in many cases the technology has been available for some time.

Cutting Costs

It is true that recent improvements such as cheaper minicomputers and better manufacturing methods for circuits are helping to reduce system costs. And this undoubtedly will make these data-gathering systems economical in applications where they were prohibitive before.

But the crux of the problem appears to be in the man/machine interface. Some of the "classic failures" of source data automation systems ignored the ease-of-entry design goal.

"Most of these systems fit the technology to the application in such a way that the user had to re-orient his data-gathering methods to live with the entry device," one designer said.

In every application where data is to be entered into a CPU, there is an originating document. The data on this document is then transcribed into computer-compatible input.

Pharmacists can record accounting and medical data by depressing special function keys on source data tarminals.

tion point for the information. Some refer to this creation of data as a transaction. And the term is used for all situations – not necessarily being limited to transactions involving the sale of goods.

Therefore, devices which are present where the transaction is taking place – or devices that actually become part of the transaction – hold great promise to ease current data-gathering problems.

'Hard Copy'

The traditional form of recording a transaction has been the paper, or "hard copy." Invariably a sales slip, invoice, inventory list, route schedule or meter reading was recorded by an operator or other person who was present to observe what was happening. This person recorded the information, usually by writing data on the hard copy.

Speedy department store sales capturing vital data can help both the businessman and customer to keep their records in order.

At this point a record of the transaction existed but the information was in most cases still not acceptable for entry into the CPU. With this type of system hard copies were sent to a conversion center where cards were punched, magnetic tapes created, and data was transcribed into computer-compatible input.

But instead of saving labor through the aid of computers, these systems actually increased the work load for the average user. He was obligated to set up a special operation that was dedicated to translating information into a form that could be understood by the computer. This same computer had been sold to him as a device that could cut down on labor-not increase it.

So the early systems, developed to capture data at the source created a more hostile environment in terms of the operator. He suddenly had a whole new set of constraints, buttons, keys and other requirements added to what had previously been a relatively simple process. The operator knew how to write his data on a sheet of paper; he identified with this process from his earliest childhood training, and he felt at home with it.

Experts Enter

But now his transaction-oriented world was invaded by technological experts and systems designers determined to bend his world into their precut mold. The results were less than satisfactory.

"The person using the system is typically one who has little clerical training. He or she may have come from a rotten environment with a blue collar background. This type of person needs a simple input method. In addition, he may very well distrust machines – and especially computers and terminals," according to an officer of a company dedicated to the development of input systems.

New approaches are being tried to simplify the man/machine interface. On some systems, the input is being tailored into terminology that the operator can readily understand.

For example, a store clerk may be queried by the CPU via a small display. The terminal might ask the operator whether he or she is entering a cash or a charge sale. In addition to leading the operator through the necessary steps, this approach puts the data entry process into terms the operator can easily work with.

More direct contacts with the people using the equipment have also led to system improvements. One point-of-transaction terminal supplier regularly questions his users' operators and encourages their comments. An example of a labor-saving idea occurred in one case where an operator suggested combining the functions of two control keys into one. She pointed out the specific type of transaction could not occur without both keys, so why not combine them?

'Performance Parameters'

User Must Consider Trade-Offs

Are there some basic trade-offs when a user is considering the implementation of a source data automation system? Very definitely, say the systems designers.

The user must determine "performance-oriented parameters," according to Malcolm Stiefel, a designer of municipal information systems.

'Total System Cost'

If a user is planning to install a source data automation system it will involve not only procedural and training changes but "some software changes will have to be made, and this must be figured in as part of the total system cost," Stiefel says.

The user will have to carefully monitor his volume of data, the perishability of the data (Is it really important to capture so much information immediately?); the accuracy requirements; and the on-line versus batched data needs.

"It is usually two to three times more expensive to operate an on-line system than a batched system," one systems analyst estimates.

More importantly, the cost of the source data system should equal no more than the cost of five years' operation of the user's present (probably manual) system. The five-year figure is based both on implementation costs and obsolescence. The experts reason that a system that cannot be paid for within five years will no longer be state-of-the-art and will probably be due for replacement as new

(Continued on Page 9)

One problem that very much concerns users of source data automation systems is the reliability of the system and the provision for backup in case of failure.

"When you have 3,000 people ready to clock out with an automated system they should be able to get out in a minute and a half with a good system," according to Paul Landry, director of marketing at Extrex Corp. "You can't allow such a system to break down, and most users are not prepared to completely put themselves in the hands of a machine."

Permanent manual backup is a very extravagant luxury, Landry says. "Only the military can afford to have 100% redundancy. A viable system must achieve 99% reliability at a low enough per transaction cost. And even if cost is dropped, reliability is still a problem. It is very difficult to lower costs while increasing reliability, Landry says. "This is a paradox of the source data automation system. And it is why good applications are not easily implemented."

One solution to the reliability problem involves a gradual step-by-step introduction of a source data system. The user should be able to start with a basic processor and automate one function at a time. With this method there is less risk, and less sudden initial cost. It is feasible to automate phase two of a data-gathering system with the money saved from successful implementation of phase one. For example, a department store might save enough on its automated point-of-sale system to allow the addition of credit checks.

But there are also problems with the graduated approach.

Invariably the user will have to exercise accurate foresight to allow for expansion in his initial system. In addition, spare capacity can be expensive.

Reader/Dialer Device

Industry May Use 'Old' Card

One source data entry method moving toward new applications is the embossed card. First used for credit authorization and charge purposes, the same cards and card readers are now finding their way into industrial environments.

The Audac Products Division of Elliott Business Machines Inc. is currently developing an automatic card dialer/transmitter that could be used by production workers on the factory floor to enter information relating to their output. The device will be similar but more versatile than the AT&T card dialer.

Working with embossed card readers, a worker could enter "static" information via precoded cards.

"The worker could have a dial card identifying the product that he has worked on. He would insert the card into the reader/dialer device and would then add the number of units that he has completed," according to Jurgen Kok, product manager.

The combination reader/dialer not only captures the static data but it also automatically dials up the line and gets it ready to receive variable data to be entered later from a keyboard or touch-tone pad, according to Kok.

"In a payroll application we would have the clock number and rate of pay of the worker. The timekeeper would then add the hours worked by keying in a few additional bits of data." And this information could be transmitted simply over dial-up or dedicated lines. On-line time clock punching by the employee is also a potential use of this type of system, Kok said.

"This type of card reading approach lends itself to a large number of applications," Kok says. "And these types of terminals are much cheaper than the more sophisticated on-line systems."

Audac is promoting an optical card coding system it says is "the most reliable and least expensive" of current scanning systems. Compared to Bell's card dialer which can handle only 14 characters, according to Kok, the Audac system, based on 30-bar code characters, can be applied to each edge of the card.

"The 4-bit binary code is printed in black against the white background of the card. It can be scanned along the lower edge in one sweep, Kok said. All four edges could be scanned with high reliability for a total of 120 characters of data. Any attempt to alter the data is plainly visible, Kok said, compared to other coding methods that can be altered without any visual indication such as the magnetic stripe.

The dialer/transmitters do have some drawbacks. They are limited to use at sites where a phone is available and they cannot be used by assembly line workers who cannot leave their position to go to a phone to enter data. But they do illustrate how a little imagination goes a long way toward adapting existing systems to new environments.

Basic Trade-Offs Must Be Known

(Continued from Page 8)

source data capturing methods are devised.

In general, the date being automated must be valuable to warrant close watching. And this need is not necessarily based on monetary value.

Railroad cars must be monitored closely because a lost car costs considerable sums to those directly affected by undelivered goods and unmet shipping schedules.

Verify Credit

But on a smaller scale, when a customer in a supermarket has to wait 10 minutes for the manager to be called to approve her credit, the business user is also adversely affected. "Customers are not averse to leaving their purchases on the floor and walking out of the store," says one manager who knows -- "you have to treat them right the first time or they won't come back." In this type of environment, the value of the intangible benefits produced by on-line source data systems is difficult to measure.

Is it economical to automate record keeping on the production floor? Yes, say the designers, if the user can cut down on his losses. Under manual systems, 20% of total production sometimes goes unreported or cannot be accounted for. Automated record keeping together with associated byproducts, like more accurate management information systems, will often justify the cost of a source data system in these environments.

A specially designed terminal allows a broker to place stock orders for his client directly onto the floor of the proper securities exchange.

In many cases where source data automation is not cost effective, the problem may lie in the proposed system rather than the application. For example, it may be prohibitive for a user to apply a custom-designed terminal in his plant to replace time clocks used for payroll. But if the same work records are included as part of production information, using multipurpose terminals for both uses, then the cost analysis may be much more favorable.

Part II looks at some successful source data applications.

Editorial

Needed: Light, Not Heat

Computer-related issues such as privacy and credit reporting are likely to receive close scrutiny during the upcoming session of the 92d Congress.

These issues, which affect everyone, deserve close examination and rational debate.

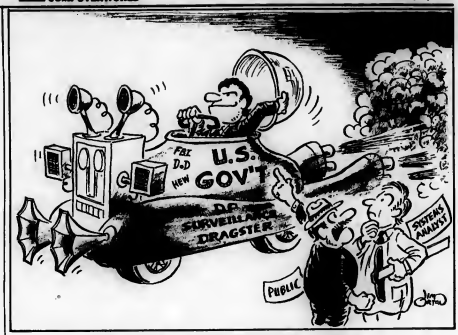
But 1972 is a presidential and congressional election year. Debates in such years often generate more heat than light.

We need debate on these issues.

But we do not need quick "solutions" based on catchy slogans designed to gain political exposure for particular candidates.

We hope the debate can be carried out in a rational, calm manner. Members of the computer community can help by watching for irrational outbursts and immediately writing to the candidates responsible, to the candidates' opponents, and to the media in which the irresponsible statements appear.

If we do not take a hand, the applications of computers may well be hogtied by legislation passed in the heat of political campaigning and based on misconceptions, not facts.



'Now You've Got to Build One That Can Catch It!'

Letters to the Editor

Is It 'Customer Loyalty' Or Just Lack of Choice?

For some time I have been concerned as to what determines "customer loyalty" to a computer manufacturer.

I have completed many survey forms and have yet to see a question which asks whether continuing loyalty is to be expected because there is no other real choice.

I suspect that an honest answer might sometimes be: "Yes, I intend to upgrade with the same manufacturer, but only because I have no other choice. I am in such a mess with multiple unique programming languages and complicated operating systems that I couldn't convert to another manufacturer if I wanted to."

I suggest this type of survey questions might provide some interesting results.

Ronald E. White, SCDP

Beverly, Mass.

Reconcile Count Variations

The handling of a transaction delayed beyond its normal processing cycle is indeed a classical system problem, particularly if this delay spans events such as physical count and month end "closing."

In a Jan. 12 letter James Lewellen disparages a system mechanism, suggested by Richard T. Lilly [CW, Dec. 8], called "adjustment filter" which is intended to block the effect of willy-nilly posting of such delayed transactions. However, the only solution I can see in Lewellen's proposal is to "print it all out and let someone look at it" . . . hardly a breakthrough in design.

As to the suggestion of carrying both machine count and actual count, how and when are physical count variations reconciled? For until that is done, I have two on-hand counts, a most unsatisfactory situation.

J.E. Phillips

Cincinnati, Ohio

Volunteers Requested

The Committee of Responsibility to save war-injured Vietnamese children needs volunteer keypunch operators to enter names and addresses on IBM cards. After the cards are punched, we need individuals or firms to turn these names into address labels. This is currently being done on a 407 and a 306.

The skill and resources at your disposal can give innocent victims of a tragic war a second chance at life.

Phyllis Brandon
Assistant to the Exec. Sec.
Committee of Responsibility
Newton Centre, Mass., 02159

Torrington Co., Not Torin

In the article on independent disk systems [CW, Jan. 19], you referred to the Torrington Manufacturing Co. as a user of Marshall Data Systems' disk units. I believe if you check further you will find that it is the Torrington Co. that uses these disk units.

For clarification, Torrington Manufacturing Co. has been renamed the Torin Corp. Torin is located in Torrington, Conn.

We did, however, replace IBM 1311 disk drives with Memorex 630s, which are attached to our 360/25. As a result, we have realized a significant cost reduction and we are perfectly satisfied with performance.

Michael J. Dirrigl

Torin Corp.
Torrington, Conn.

Disk Drive Article 'Biased'

I was most pleased to find the "Viewpoint" article [CW, Jan. 12] discussing the approach of various vendors to file organization on double density disk drives.

My pleasure dissolved into anguish as I read, since two-thirds of the discussion presented a very biased "pitch" for one of the five methods.

The bias is uncharacteristic of *Computerworld*, and is in fact unexplainable. Unless, that is, one notes that the method praised just happens to be unique to the products sold by the author's employer.

C.R. Benjamin

San Pedro, Calif.

People naturally tend to be biased in favor of solutions they have chosen, thus the "viewpoint" warning label. Ed.

Here's How to Curb Gross Waste of Manpower

By Thomas L. Scott
Special to Computerworld

Remember the "counterfeit" executive – the young man out of his technical element and contributing to management disasters? What causes a man who has proved himself in one world to enter another?

He knows it's a world peopled with many counterfeit executives who have risen from a technical beginning like his, only to sit bewildered behind a fake walnut desk in a carpeted office longing for just one more real world technical problem to solve.

He knows the world is filled with tedious paperwork, endless meetings and ulcers. He knows his very survival is an ominously low statistic, yet he tries it.

Why?

Typically a company's top level management is crowded with technically minded executives, jockeying in their poor way for the choice parking stalls and the best windows. Those few rare birds with real management capabilities are forced to contend with and compensate for their fellow executives. This leaves little time to manage.

Buried inside the heads of many counterfeit executives is a brilliant idea for new products and new methods worth many dollars to the company. But an executive cannot suggest a design change in a printed circuit board.

So the company engages in a recruiting drive for technical trainees and ignores the technical expertise already within the company. The newly hired technical individuals will learn the old circuit, get the same idea for a change, and then discover they've been promoted to management.

Why does this happen? In case you haven't guessed, it's the "Almighty Dollar." A technical man can seldom expect a salary to exceed $20,000. Most management jobs begin within this range, and the executives with whom he associates may be earning five times that maximum. These may be counterfelt executives or misplaced technicians destined for cruel exposure with the first real crisis, but that salary looks damn good to tech.

Here's a suggestion to curb this gross waste of manpower. Restructure company organizations so that technical positions exist on the same level with various management levels.

If a particular management level is worth $50,000 a year and a man is producing in that position, you keep him. And if a technical man is producing $50,000 worth of ideas for a company, you should pay him.

To further discourage technical producers from leaving their area of competence, begin recruiting management-oriented individuals, instead of promoting the technically oriented. Hire management trainees with the same stringency now placed on technical positions.

Encourage a technical person with management potential to give it a try if you wish, but give him a nice return to if he decides that management isn't his bag.

Finally, reward excellence. When an individual is challenged to do the impossible and does it, acknowledge him. Pay him, promote him and photograph him.

No dollar value can be placed on the potential of a company which has highly motivated people working in a comfortable niche and knowing that there is one step up in his area of competence, even if he is a tech.

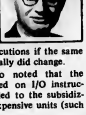
Scott is an applications analyst for the Singer Co., Friden Division, San Leandro, Calif.

Viewpoint

Are Maximum Charge Quotations the Answer?

In two recent articles the problems in charging for computer time were discussed. The first article, "Should Charges Vary With Each Job Execution?" [CW, Nov. 3], revealed that varying charges were politically unpopular, and also that the current normally used method (the count of input/output execute instructions and computer seconds) was not as realistic as the resources involved in different executions if the same program actually did change.

The Taylor Report By Alan Taylor, COP



It was aslo noted that the charging based on I/O instruction counts led to the subsidizing of the expensive units (such as the large disks) over the more economical tape drives and card equipment used.

In a second article, "Must Management Replace DP in Billing Quandry?" [CW, Dec. 8], it was pointed out that charging should not be done simply as a function of computer time, which is the basis of most charging systems today. Instead it is a management responsibility to evaluate the particular processing being performed.

It was noted that the basic charging flowchart really required two inputs instead of the one usually used, with one input continuing to be a measure of the amount of work produced, and the new second input the value – as determined by management – of the particular work currently being produced.

Varying Time Charges

T.E. O'Connor in a Letter to the Editor [CW, Dec. 22] claimed that there was a very simple way to handle the varying time charges for the same program. He said that although individuals had not realized it, varying charges were quite acceptable and politically realistic – providing the variation was always downwards! "Quote a maximum possible charge on the user's job, i.e., if running all alone and absorbing all processor overhead" was his solution.

He has a very good point. He is quite right in that varying charges are acceptable, providing they are scaled downwards. He is quite right in saying that a job should be quoted at the maximum charge it may incur. But, if we followed his thinking into considering the maximum as being the cost of running a job on a dedicated computer, we would run into some other problems. So before jumping from the frying pan into the fire let us consider the problems.

Ready to Pay?

To start with, there is the question of whether or not all users are really prepared to pay for or authorize their jobs being run on an otherwise empty computer. I do not think they are.

If I had a Cobol compilation which takes 64K and uses two disk drives, I would not want to pay for a 256K computer with eight tape drives and eight disk drives! If I am running Cobol on a 360/40, I do not want to pay for the processing power of a 370/155! I would take the job away from my own computer and give it to my friendly service bureau.

Using one's own firm's computer obviously has some hidden advantages; so, like the Buy America Act, there should be some differentiation between money that has to be paid outside the firm, and money that has to be paid internally.

But while a 10% to 15% differential seems to be a reasonable one, many times demanding the authority to make the maximum charge could raise the differential to over 80% – if the job was to be used by the firm's computer! This sort of differential is not economically justified, and would simply be a hidden subsidy to the computer department.

Financial Advantage

Of course, if there really is a stream of additional jobs waiting which are most economically done on the firm's computer, rather than on competitive equipment, losing the Cobol compilation to an outside firm should yield a financial advantage for the computer system.

But if one started trying this he would soon find that the computer center was objecting to losing the work because while it was losing the income from the jobs that were going outside, the expenses were staying the same. In fact, the center would now be saying that running the job was not really costing it anything at all!

So charging the maximum leads one to wonder just what is the cost of the computer for doing that three-minute Cobol compilation. Economists divide costs into two major types – direct costs and indirect costs. There is a school of thought in computer centers which accepts this, and claims the direct costs are represented by the time a computer spends doing the job, and that the indirect costs are represented by the time a computer spends in the operating system, etc.

T. E. O'Connor really subscribes to this point of view. He says that as far as he is concerned the cost of a job running alone in the system is the cost of his department divided by the usual amount of productive time he gets out of the shift to give an hourly rate, which is essentially how most users determine computer costs.

Overhead

Direct costs always seem to be simple, but traditionally often turn out, upon inspection, not to be direct costs at all – but some form of overhead. A retail store, for instance, may think that the rent of the store itself is a direct cost. If it closes the store before the lease runs out it will soon find that, in fact, it was not direct at all, but an indirect cost.

Similarly with the computer system. If O'Connor lost a particular compilation work load and did not have additional work to put into his system, he would have to make up the income elsewhere, by charging higher hourly rates to other users. Since the additional cost of running the compilation was essentially nothing, what he is basing his charges on is resource allocation, not costing!

In fact, today, practically all computer billing systems are built upon a confusion between resources and costs, and do not realize that for most user jobs the computer costs are only indirect costs, and not direct ones at all!

Maximum Charge

O'Connor is quite right in saying that the user should be billed varying charges based on the amount that the computer department has been able to save him, but the maximum charge has to be based on something other than resource-usage charges if maximum economic utilization of a company computer is to happen.

This ties in with my previous statements that the charges should be related to a management-described arbitrary evaluation of the product. The idea of quoting maximum charges carries one step further, by saying that one of the inputs to management – when it is determining the value – should be some form of the maximum charge. It carries us one step up the ladder away from the implicit unfairness that exists in one current charging system.

Just what the necessary maximum charge should be based on, however, has not yet been brought out. Perhaps some other readers have some ideas on this that would add yet another step to proper costing.

Government Buying... In Theory and Practice

Nearly three years ago, after considerable study, the Government Accounting Office (GAO – which is the watchdog of the other government agencies – issued a report on plug-to-plug computer peripherals, including magnetic tapes.

The report said that the government agencies should use the independent peripherals instead of mainframe manufacturers' equipment because they were cheaper and gave the same performance. Its first recommendation was that all the heads of the various federal agencies should "require" the replacement of the IBM tape units and disk drives already installed. Those were strong, encouraging, words.

Taylor Thoughts

Those Numbers

People in Washington will say that, in fact, the government agencies have followed this recommendation. Some will even exclaim about the "total success" in Phase I replacement operation, which involved the replacement of these units. But when it comes to numbers they may get a little vague. It is not that they do not have the numbers, of course, but it is what the numbers really mean.

After all, the people in Washington say there are not that many IBM computers in government service. "IBM has not won a major contract for years – perhaps one or two slipped in, a single contract here and there, but no major contract," is the old refrain.

It is a nice line, but it does not really hold water. And for all users of computer magnetic tape the failure of a substantial government market to develop is quite serious, because here is the one market which is supposed to be open on the merits of the equipment.

Every tape unit the government obtains from IBM is one less sale made by the independents – and weakens their competitive position. In turn, this weakens everyone's hopes of getting good, strong competition in this important industry, and the resulting user benefits.

The failure to develop has occurred because the GAO forgot (it probably thought is was self-evident) to ask the heads of the federal agencies not merely to replace the installed IBM peripherals, but also to stop acquiring new ones!

Continued Acquisition

Unfortunately this is exactly what the agencies continued to do. They have been acquiring IBM 360 systems, using a "prime contractor" style of operation at the rate of one a week over the past two years. And with the exception of the General Services Administration (GSA) they have continued to obtain IBM peripheral equipment. And while the "replacement" has been going on, more IBM peripherals have been obtained with the agencies paying a price which GSA estimates as 67% more expensive than necessary.

Another way of obtaining the expensive IBM peripherals has been to buy the officially "replaced" procurements. If the replacement program was really going strong, one would expect to see a large number of tape drives returned to IBM. Some have been, but nothing like the number claimed to have been replaced.

Instead, the drives are often being shuffled from one installation and reinstalled in another. Again, the independent industry which needs support is being weakened.

It is a pity that the government provides so much support to the strong, and so little support to the ones who provide better performance for the user.

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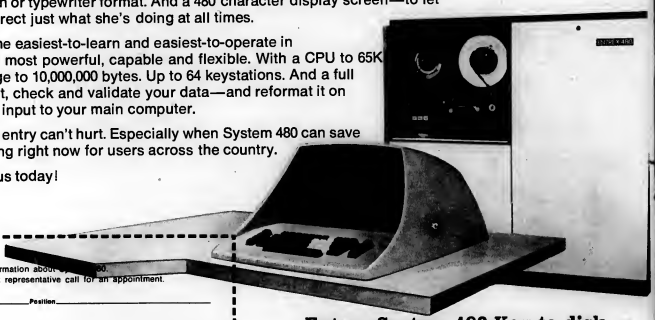

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Passing the CDP—Part II

Study the Basics, Definitions

This article is the last in a series on preparing for the Feb. 19 CDP exam. It gives some helpful exposure to critical areas in one of the five exam stages, quantitative methods, which requires the most preparation for the DP professional.

By Mike Ingram
Special to Computerworld

The quantitative methods portion of the CDP exam consists of three application areas: accounting, mathematics and operations research and statistics. Although these are extensive subjects, preparation will not be difficult since the exam centers upon fundamentals and definitions.

Accounting itself consists of four areas: general accounting, cost accounting, DP auditing and internal controls and management's use of accounting. For general accounting, review a fundamental text on accounting.

Know the accounting equation and peruse the journals and the general ledger. Clear your thinking on double entry bookkeeping and practice a few of the major debit and credit entries.

Define a trial balance. The difference between the cash and accrual methods should be studied. Outline an income statement and a balance sheet and define depreciation and review the major depreciation methods. A comparison should be made of inventory evaluation methods.

Cost accounting aids in the collection and control of costs. Job order costs and process costs should be defined. Make a differentiation between physical and perpetual inventory systems.

Define standard costs, direct costs, indirect costs and overhead costs.

DP auditing can be done through or around a computer, so review these procedures. Follow one of your own audit trails to observe the interfaces between auditor and computer.

Study a DP management checklist, and review hardware and software controls. Footing, hash totals, range checks, field checks and batch totals should be defined.

Stock brokers often provide good summaries for interpreting financial statements, so locate one. Review budget procedures and budgeting analysis and define present value and discounting cash flows. Briefly explain responsibility accounting and exception reporting, and know what a current ratio is.

Math and Operations Research

Do not be fooled by the title. Remember, only concepts, fundamental principles and basic definitions are sought. There are roughly half a dozen areas to concentrate upon. The first is mathematical computations. Know the rounding rules for additions, multiplications and division. Similarly, refresh your memory on significant digits.

Bone up on the binary number system. Review the basic concepts of exponents and subscripts; do one or two problems in factorials, summations and inequalities.

Very briefly review the second area of set notation – venn diagrams, decision trees, unions, intersections and set theory.

Sequences and counting schemes are a third area for review. Arithmetic and geometric progressions should be studied. The programmer aptitude test will help. Know how to compute the next term in moving averages and exponential smoothings. Define permutations and combinations, and know when to use them. Finally, look up the concept of convergence.

Matrices and calculus make up the fifth application area in the review of mathematics. Define a matrix and a vector. Matrix operations should be reviewed for an hour or so to understand how to solve a problem involving simultaneous linear equations.

As far as calculus is concerned, know what the concepts of differentiation and integration are.

Review graphically what is done by these two concepts. There will not be any problems to solve using calculus!

There will be few questions on operations research and linear programming. Quickly review linear equations and the formulation of linear programming models. Define solution, degeneracy, slack variables and the dual solution.

Familiarize yourself with basic inventory models, the transportation model, and skim over allocation models, queuing theory and gaming theory. Remember, it is the basic concepts that count, not the calculations.

The test will contain basic concepts and definitions in statistics. Know the definitions of frequency distribution, histogram, mean, median, mode, weighted average, standard deviation and variance. A second area of review is probability. Define it and define a simple random sample.

Sampling will most likely be on a portion of the exam. Know how to relate averages and variances of samples and populations. Review Bayes' theorem on the binomial distribution and the central limit theorem.

Readily available references include: *Introduction to Operations Research* by Churchman, Ackoff, Arnoff; *Management Control of EDP* by IBM; *Fundamental Statistics for Business and Economics* by Neter and Wasserman; and *Fundamental Accounting Principles* by Pyle and White.

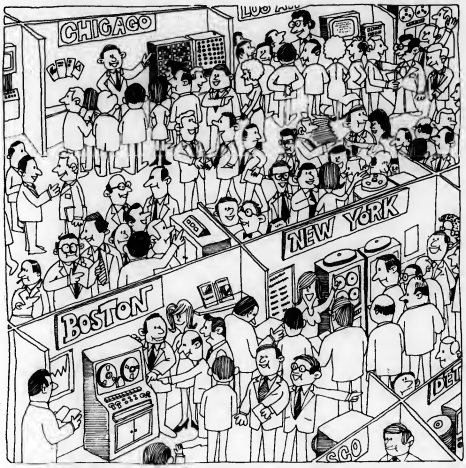
Mike Ingram, CDP, is manager for Information Services for Lenox China, Pomona, N.J. He holds a B. S. from Carnegie Mellon and an MBA from the University of Denver.

BOSTON
Feb. 22-24
Sheraton Boston/
Hynes Memorial Auditorium

NEW YORK
Feb. 29-March 2
Americana Hotel

WASHINGTON
March 7-9
Washington Hilton

ATLANTA
March 14-16
Regency Hyatt House



DALLAS
March 21- 23
Market Hall

LOS ANGELES
April 4-6
The Ambassador

SAN FRANCISCO
April 10-12
Fairmont Hotel

CHICAGO
April 18-20
Palmer House

DETROIT
April 25-27
Cobo Hall

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Call Charlie Asmus at (617) 332-5606 and he'll be glad to give you all the details. See you at the Computer Caravan . . .

Random Notes

AED Software Engineering Adapted to CDC Units

WALTHAM, Mass. – The AED high-level language, which includes strong systems programming facilities, can now be used on CDC 6000 series CPUs, with the release of the AED-CDC6000 programming system from Softech, Inc.

The new version is operational under Version 3.3. of CDC's Scope operating system and produces input to the Compass assembler. It will run on the Intercomm remote batch entry program that interfaces with Scope, end with minor modifications, will operate on the new CDC Cyber 70 CPUs, according to Softech.

There is an installation fee of $8,000 and a monthly meintenance charge of $800 for in-house use of the CDC version, Softech said. Headquarters are at 391 Totten Pond Road, 02154.

ISI Provides Leasco Response Service in Rhode Island Area

WARWICK, R.I. – The programming languages and application packages of Leasco Response's Response I time-sharing service are available to terminal users in this state through facilities of Information Sciences Inc.

ISI Response Service operates on equipment at the local firm's computer center and provides users with access to more than 300 programs on an around-the-clock basis. Passwords safeguard access to the computer, restricting use to authorized personnel only, the company noted, from 14 Jefferson Blvd.

Architects Use Compaid Software For Isometric Piping Drawings

ST. LOUIS – Architects and managers of construction projects in which piping pleys a significant part, such as refineries, chemical plants or power generating stations, can produce isometric piping drawings and bills of materials with the Compaid software now available from Monsanto Enviro-Chem Systems Inc.

The package also provides a continuous inventory control of stores during construction, and work schedules. Three versions of the $80,000 system permit its use on a 32K IBM 360/40 or larger, CDC 6400 or 6600, or Univac 1106 or 1108 CPUs, the company said from 800 N. Lindbergh Blvd., 63166.

Throughput Up 10%-15%

Ampex Program Speeds Extended Core

By Don Leavitt
Of the CW Staff

MARINA DEL REY, Calif. – Users of extended core memories for the larger 360s, including IBM's own 2361 Large Core Storage (LCS), now have a David to control their Goliaths – the ECM Management Program (ECM/MP), developed by and available from Ampex Corp.

Designed originally for use with the Ampex ECM, the program is described as a patch on OS/360 that takes about 2K of core to improve the use of any of the compatible megabyte memories, including those from Fabritek and Data Products.

While the extensions themselves improve core utilization even without the OS modifications, use of ECM/MP improves throughput an additional 10% to 15% on the extensions from the independents, Ampex said. Improvement based on the 2361 is not as great as with the other units, the company added.

Use of ECM/MP is completely transparent to application programs running under the MFT or MVT options of OS/360, with or without Hasp spooling, on 360/50 or larger models.

The ECMs themselves allow more of the Operating System, and more of the user's programs to be core-resident. The Ampex program augments memory allocation functions of OS/360 and gives users the benefits of both MVT and MFT, a spokesman said.

ECM/MP, particularly under the MVT option, allows the user to control where specific jobs are done in core. With this capability, the user can, for example, put I/O-bound jobs in the .ECM since processor speed is not a prime factor for them.

The package is simple to install and may be loaded with a Nucleus Generation of OS/360 in less than seven minutes, or with a Hasp Generation in less than 10 minutes, according to company estimates.

ECM/MP is immediately available. It may be purchased for $5,000, or leased for $125/mo, for a minimum of two years.

Ampex is at 13031 W. Jefferson Blvd., 90291.

Payables Module Added to 'Cats' Multi-User Accounting System

BIRMINGHAM, Ala. – Invoice processing, cash requirements listings, check writing and account control can all be performed on a 32K IBM 360 in a multi-client, multi-location data center environment with the Cats Accounts Payable package from Computer Wares Inc. (CWI).

The package is one segment of the Computerwares Automated Total System (Cats), ICW, Nov. 3) which allows users to build integrated financial and inventory control systems, one step at a time. Cats modules, including this one, can be used .independently or as part of the overall system, CWI said.

With this package, invoices due for payment are listed before check writing to let the user change payment dates. Check writing includes a sequence report for check restart and rewrite capability. Manually prepared checks can be taken into account by the system.

Each processing cycle that changes a balance field causes an audit record to be generated, showing beginning file balance, the changes and the new balance. After check writing, an outstanding payables report is also prepared, listing all unpaid invoices.

Summary balances are kept by job, division and company. Detailed distributions for general ledger processing are prepared monthly, followed by a summary total for posting.

All of the Cats modules are controlled by the Cats Master program which schedules, monitors and interchanges related data between the various applications.

The Cats system operates under DOS/360 with 32K bytes of core and two 2311-type disks. Written in Cobol D, the accounts payable package is available for $5,000 for in-house use.

Computer Wares Inc. is at 745 N. 41st St., P.O. Box 31205, 35222.

9K Novas Use BIS Data Manager

WALTHAM, Mass. – Data and file management capabilities previously available on large-scale CPUs can be handled in 9K words of core on a disk-oriented Data General Nova mini with the BIS Information Manager (BIM) software from Business Information Systems (BIS).

BIM is structured around a list processor and a report writer. The list processor allows the user to manipulate strings of short "pointers" rather than full-length data records.

With the list processor, data records on disk are directly addressible but are never repositioned to create new files. Since the pointer records are resequenced by job, however, the data file appears to be physically reorganized, the company noted.

By avoiding both movement of data records and compilation of a report program for each job, BIM is said to produce results far more quickly than competitive systems.

Normally, BIM will be tailored to the user's needs. Current implementations include an order entry application and an investment management system.

The software is available separately to current Nova users on a negotiated basis, but is normally provided as part of a turnkey system, including the mini, disk, printer and one terminal. The system "might" cost as little as $50,000, but would generally cost between $70,000 and $100,000, depending on capabilities.

BIS is at 400 Totten Pond Road, 02154.

Interface Between Analyst, Programmer Eased, Standardized by Hoskyns 'HSL/1'

NEW YORK – The interface between systems analyst and Cobol programmer is made easier through standardized documentation generated by the Hoskyns Systems Language (HSL/1) and now available from Hoskyns Systems Research Inc.

The new program forces the analyst to define the relationship between I/O files and programs within a system in a uniform manner. Having identified the programs and files, the analyst uses the same specification sheet to define the relationship between each file and its records. A similar form can describe the record layouts.

HSL/1 uses the information from the specification sheets to generate a File I/O Flowchart followed by Cobol Identification, Environment and Data Division coding, for each program in the system.

HSL/1 operates under OS/360 and generates code suitable for either Cobol F or the ANS compiler. The Program/File Processor portion of the system uses a 44K region, the Record/Data Processor fits into 26K bytes.

A two-year lease of HSL/1, with full maintenance, is available for $8,000. Hoskyns is at 600 Third Ave., 10016.

Perspective Drawings of Molecules Produced on Plotter Tied to 1130

YORK, Pa. – Chemists with access to an IBM 1130, Calcomp plotter configuration can obtain perspective drawings of almost any complex organic molecule, with the Molecule Model Program (MMP) from Ampersand Corp.

The drawings generated by MMP are correctly scaled with relative atomic radii and bond length and can be oriented from any viewpoint around the molecule. Hidden lines are omitted by MMP, to add realism to the picture, Ampersand said.

Three Reports

The system also produces three reports which describe the molecular geometry in numerical terms. The bond/angle report gives all bond lengths and angles between connected atoms in the molecule and reveals at a glance whether or not the model is reasonable.

Inter-atomic distances, used in estimating non-bonded interactions, are given in the second MMP report and dihedral or torsional angles, for evaluating the geometry of rings and multiple rings, are listed in the third output form. Together the three reports describe the exact physical model, company spokesmen claimed.

Ampersand's MMP generated this drawing (reduced here for illustration) of a molecule of the solvent Cis-decalin, from two input cards.

For many molecules, the only input required is said to be a molecular formula coded in a simple line notation. The system uses heuristic rule to generate rectangular coordinates for each atom, then lets the user select the specific drawings or numerical reports he wishes.

Simple Input

Molecules with more complex organization require more extensive, but still simple input. If the molecule contains a complex fused ring structure, for example, a description of the structure must be given. Molecules containing heterocyclic structures require atomic coordinates for those atoms in the ring to maintain reasonable bond lengths, the company said.

Users may make changes in the generated coordinates or enter their own at any time, and receive drawings or reports based on the new data. This flexibility is particularly useful, Ampersand said, for checking X-ray diffractions and other structural determinations.

Present programs within MMP are written in Fortran IV for an IBM 1130 with 8K words of memory, a disk and a plotter. Source code could be easily adapted to other CPUs with Fortran capability, according to the company.

The package sells for $5,000, but the capabilities are also available as a service for the user with minimal needs. Ampersand is at 50 N. Duke St., 17401

Centers Give Remote DDA Support

DAYTON, Ohio – A small- or medium-sized bank using NCR's 720 Micr conversion/transmission equipment can shift demand deposit accounting (DDA) from its own in-house CPU to a local NCR data center with a new service offered by the company. The 720s include a check sorter, key-to-tape data encoder, a mag tape unit and a printer.

Data collected on the magnetic tape can be transmitted over phone links or hand delivered to the center where it is batch processed on a daily basis. The center generates a report tape which is transmitted or delivered back to the bank where the 720 prints the output documents.

As an optional service input can be in the form of punched paper tape produced by machines such as an NCR 482 proof encoder, a company spokesman noted.

The service can tie into the user's other applications, generating transfer-debit transactions for crediting loans, savings or other accounts within the same bank. The service can also produce a set of management reports for the bank.

The tapes handled by the NCR 720 equipment are industry compatible and could be used directly by most mainframes currently installed at banks that would subscribe to this service. NCR adapts the read/write head of each unit to the encoding scheme of the user's CPU.

Users pay an initial one-time charge of $500 plus a fee for setting up a master file at the data center. Thereafter, charges are made for file maintenance and processing, based on the volume of work done, with a monthly minimum charge of $500.

A typical bank with 10,000 items to be processed daily will pay between $1,900 and $4,300/mo, depending on the optional services provided, NCR said.

Bits & Pieces

DDC Disk Drives Available For DEC PDP-8 and PDP-11

SAN DIEGO – Plug-compatible disk drives from Digital Development Corp., called the DMS series, can be used with DEC PDP-8 and PDP-11 as well as with Data General Nova minicomputers.

The DMS Series consists of a controller interfaced to the I/O structure of the mini, power supplies and fixed head/track disks with capacities from 65K to 4M words. As many as four disk systems can be run on one controller.

Prices start at $7,695, with delivery in 90 days from 5575 Kearny Villa Road, 92123.

Cabinet Is Adaptable in Field To Storage of DP Materials

WORCESTER, Mass. – Optimadia Coordinated Cabinets from Wright Line are designed to store any and all data processing media.

The cabinets can be furnished with almost unlimited configurations, including shelves, drawers, racks, hanger bers, shelf dividers and bin drawers to allow them to be tailored to almost any mix of media, according to Wright Line. Tapes, disks, packs, cards and forms can be stored in one unit.

Prices start at $150 for a 36 by 18-1/2 in. by 58-3/8 in. basic cabinet with doors. Delivery is one week from 160 Gold Star Bivd., 01606.

Special Print Element Allows Selectric to Prepare OCR Input

MIAMI – Data for input to a Data-type OCR unit can be prepared on a Selectric typewriter using a special typing element developed and manufactured by IBM.

The DF-2 element contains upper and lower case characters plus a bar code corresponding to each character. It is available through IBM Office Products as part number 1167659 at a cost of $18.

S/3 Card Readers From Bridge To Be Maintained by Sorbus

PHILADELPHIA – Bridge Data products here has signed an agreement calling for Sorbus, inc. of King of Prussia, Pa., to install all card readers Bridge now markets or has under development for System 3 end-user installations.

Purchase prices of Bridge readers include maintenance for two years; lease prices include maintenance, Bridge said.

Adage Offers Ards CRT Leases

BOSTON – Adage, Inc. will offer its Ards graphic display terminals to its users on leases that will be financed through Data Dimensions, Inc. of Greenwich, Conn.

Under the plan, Adage salesmen will be able to write lease agreements with the user at the point of sale contact as an alternate to an outright sale, Adage said.

Shredder Needs No Supervision

FREEPORT, N.Y. – The latest model of Shredmaster Corp. Jet-12 has a greater capacity of paper shredding, works automatically without supervision on continuous forms and is powerful enough to shred metal coins.

The unit has a price of $620 and is available on 30-day delivery from 891 Ocean Ave., 11520.

Switches Peripherals

Console Monitors System Performance

By Frank Pasta
Of the CW Staff

MAHWAH, N.J. – A control console from Teleprocessing Industries, Inc., a subsidiary of Western Union Corp., allows the operation and configuration of large multiprocessor computer systems to be monitored.

The L1000 Systems Console can also be used to control the equipment in real-time data-switching network sites, according to the company.

The console can be used with any combination of processors and peripherals, the company said. It will find particular application at those sites that require swift switching of peripherals between computers to provide backup in case of equipment failure.

Information Display

The device can be used to display information about each computer or peripheral attached to it. This includes whether the device is operational, which devices are being used to make up the various configurations, and which components have failed.

Peripheral switching to reconfigure computer systems is more accurately accomplished with the control console because the desired configuration can be displayed in advance, eliminating the chance of illegal system assignments, the company explained.

The L1000 features modular construction, enabling it to be easily accommodated to any configuration of computers and peripherals. This modularity, the company said, also allows the computer system to be updated and expanded more easily.

The status of on-line devices is shown on a display board with multicolored single and changeable projection indicators. The console unit contains switches to control the interconnection of equipment attached to it.

Indicators on the display panel coordinate controls on the operating panels with lights on the display board.

A typical system, which could control several large CPUs and their peripherals, would be priced at about $75,000.

Teleprocessing Industries is at 82 McKee Drive, 07430.

L1000 Systems Console monitors Univac site.

Disk Replacement for Fastrand Offers Better Price/Performance

ANAHEIM, Calif. – A disk storage system from California Computer Products, Inc. is designed to provide higher performance at lower cost compared to the Univac Fastrand Mass Storage drum it replaces on 400 and 1100 series systems.

The Calcomp 1144 DS is both plug-to-plug and program compatible with the Fastrand drum and may be attached to the interface of the Univac computers. Throughput of the disk system is over 100% greater than that of the Fastrand II, Calcomp said.

2 Configurations

The 1144 DS is available in configurations to replace either the Fastrand II or Fastrand III. The basic system consists of a single-channel controller and one "storage string." A storage string is made up of three disk drive spindles with a total storage capacity of 22M 36-bit words or 25M 30-bit words, equal to that of a Fastrand II.

The Fastrand III-type string uses four disk drive spindles with a capacity of 33M 36-bit words.

The basic configuration may be expanded to a total of eight Fastrand II or Fastrand III-type strings on one controller. A dual channel controller is optional and permits simultaneous read/write operations on two different storage strings in the same data bank, either from two processors or from two I/O channels on one processor.

The disk system, Calcomp said, eliminates many of the drawbacks inherent in the Fastrand drums.

Protection for security sensitive data is provided because the data can be taken off line when not being used, limiting unauthorized access. Because a new set of disks can be used for program development or enhancement, working files can be more easily protooted, Calcomp explained.

The price of the basic configuration is $3,850/mo, excluding maintenance. Delivery is 90 days from 2411 W. LaPalma Ave., 92801.

Mini-Based

Off-Line COM Records Graphics

GARLAND, Texas – The Seaco 451 Graphic Computer Output Microfilm Recorder is designed to provide off-line recording to computer-generated graphic and alphanumeric data directly onto microfilm.

The unit, from Seaco Computer Display, Inc., combines the company's 401 COM recorder with a control minicomputer and one or two tape drives. Simulator programs and print tape processors make it possible for the 451 to accept almost any data without reformatting, the company said.

Input is from 9-track tape at 556 or 80 bit/in. density. Tape speed is 37.5 in./sec.

Slides Used

Images can be either hardware or software generated. The hardware can generate one size at 30,000 char./sec, with up to 80 160-character line/page. The character set consists of 73 symbols. Frame orientation can be either cine or comic. Slides are used for form generation. Vector drawing rate is 4 mils/µsec.

The software generator can handle up to 10,000 char./sec in 64 sizes. Characters per line and lines per page can be programmed in any format. Up to 128 symbols are included in the character set; fonts are programmed. Intensity is available at 255 levels and four positions of frame orientation can be specified. Four line widths can be selected.

Either 16mm or 35mm film in 600 ft magazines can be used; 105mm film is optional. Frame advance time is 130 msec and reduction is 12X for 35mm, 24X for 16mm.

The monitor display is a 12 in. CRT. An interactive Seiectric-based keyboard is provided. System control is through an 8K 16-bit word minicomputer with a 256K word disk.

The basic system includes a magnetic tape drive, 8K computer, disk, operator station and selection of film size and is priced at $200,000 from 2800 W. Kingsley Road, 75041.

Serial Printer Uses 9 by 7 Dot Matrix

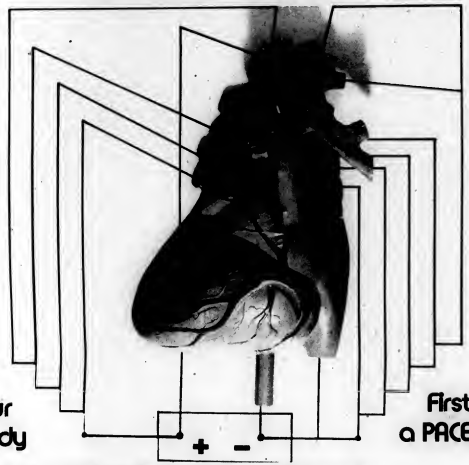
HUDSON, N.H. – A low-cost impact serial printer from Centronics Data Computer Corp. uses a 9 by 7 dot matrix to produce very high quality printing impressions, according to the company.

The 101A printer, which operates at 165 char./sec, has a full 64-character set and can be attached to most popular minicomputers, Centronics said.

Line speed depends on whether short or long lines are printed. Long lines of 132 characters are produced at 60 line/min, while short lines are printed at 200 line/min.

The 101A is priced at $4,130. First shipments are scheduled for this month.

resource control...
(for system 360/370)



Only Our and Already

First Year a PACEmaker!

Today, one year after our initial installation, the Deta Acquisition System is the heart of computar resourca management systems operating in 23 major computer centars throughout the United States and Cenada. It is halping deta cantar and corporata managers in major banks, stata and local govarnments, insurance companias, and service orgenizations to improve their utilization and control of computar resources.

We now wish to announce the Resource Billing System, the second program product in "PACES"—PACE Computar Resource Control Systems.

DAS for Computer Utilization: By using our PACES Data Acquisition System (DAS) for OS/360/370 installations, PACE customers are abla to:

- Effectively measura equipment utilization in the multiprogramming anvironmant.
- Ralata resources used to each job and stap in a rational and consistant way, regardless of the job mix.
- Vary timing and cost factors to adapt to new configurations without reprogramming or test altarnative costing policies using actual job streams.
- Identify bottlanacks by reports on: throughput; job abends; CPU, channal, and core utilization; and I/O devica utilization.
- Build the master job accounting data base which provides the foundation for growth to othar capabilities.

RBS for Cost Distribution: The Resourca Billing Systam (RBS) givas the computar canter managar a comprahansive and flaxibla capability to distributa costs to both computer cantar oparations and users. Tha RBS uses the DAS resource utilization data base as input. The processing programs apply credits and debits as necessary, forming an adjusted data base. To insure data integrity, a datailed edit program chacks all system credits and special chargas before allowing these adjustmants to be applied. Tha RBS then processes the adjusted data base, constructing datail and summary invoices, and analysis reports.

Growth: PACES program products will support DOS/360/370 in April 1972. Raport formats for DOS and OS systems are assentially identical. Furthermore, the DOS job accounting data base can be processed with the OS data base, to genarate combined reports.

Support: PACES program products support the two most current releases of OS/360/370 MFT, MVT and MP65 configurations, and HASP/ASP support processors. Acceptance and Warranty periods are established for each product. We provide comprehansive technicel documentation, including complete technical specifications and information on, system control, system installation, and system operation.

PACES Accounts

BANKING	
New York	S/360/65-MVT
New York	S/360/50-MVT/HASP
New York	S/360/50-MVT/HASP
Illinois	S/360/65-MP/65
Quebec, Canada	S/360/50-MFT/HASP
INSURANCE	
Ontario, Canada	S/360/50-MFT
Ontario, Canada	S/360/50-MVT
Pennsylvania	S/370/165-MVT/HASP
Ontario, Canada	S/360/50-MFT/HASP
Ohio	S/370/155-MFT/HASP
DATA PROCESSING SERVICE	
Ontario, Canada	S/370/155-MVT/HASP
Colorado	S/370/155-MVT/HASP
MANUFACTURING	
Connecticut	S/360/65-MFT/ASP
Massachusetts	S/370/155-MVT
PUBLIC SERVICE	
Quebec, Canada	S/360/50-MVT/HASP
Quebec, Canada	S/360/50-MFT/HASP
British Columbia, Canada	S/370/155-MFT/HASP
Massachusetts	S/360/50-MVT
District of Columbia	S/360/50-MVT/HASP
Manitoba, Canada	S/360/50-MVT/HASP
GOVERNMENT	
County Government	S/360/50-MFT/HASP
State Government	S/360/50-MFT
State Government	S/360/65-MVT/HASP

For further information on PACE program products, please complete the coupon below, or write or call collect to: **Howard Olde, Sales Manager, PACE Applied Technology, Inc.** *(formerly PACE Computing Corporation)*, **1117 North 19th Street, Arlington, Virginia 22209, (703) 527-4810.**

I am particularly interested in ☐ OAS(OS), ☐ DAS(OOS), ☐ RBS.

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PACE Applied Technology, Inc.
1117 N. 19th St., Arlington, Va. 22209

PACE

Hawaii-to-U.S. Link

Satellite 'Moves' Pineapples

By Ronald A. Frank
Of the CW Staff

SAN JOSE, Calif. — Some U.S. computer data users are already using "domestic" satellite links even though the FCC has yet to establish regulations for such systems. These links use non-domestic satellites to connect the West Coast with Hawaii and Alaska.

One of these users, Computer Information Services (CIS), has been transmitting data between the West Coast and Honolulu at 9,600 bit/sec since last spring, using a Pacific Ocean satellite channel supplied by ITT World Communications. CIS uses data compression techniques to cut down on the transmission of unnecessary characters, with special software and Data 100 terminals.

Most of the data being handled on the CIS link is related to the operations of Dole Pineapple. With a 1410 in San Jose, Dole shipping order requirements sent from two U.S. distribution centers are transmitted via satellite to dual 360/40s in Honolulu. The satellite link is used for both voice and data, and costs about $7,000/mo, according to ITT.

Paper Tapes

The Dole distribution centers in New York and Chicago use Burroughs L-2000 programmable terminals to produce paper tapes which are transmitted to San Jose via Bell Data Speed lines. In San Jose, the order information is processed on the 1410, and the batched data is entered into a Data 100 terminal for transmission to Hawaii. CIS uses Milgo 5500/96 modems at each end of the link.

Data from the San Jose center is transmitted by Pacific Telephone & Telegraph lines to the San Francisco facilities of ITT. From there the data is sent via the satellite link to Hawaii.

The data compression is used primarily for transmission being sent back to the U.S. Under software control, one of the 360/40s in Honolulu compresses data by replacing character strings not essential to the flow of information.

When the data is received in San Jose, the Data 100 Model 70 terminal recognizes the three control characters and automatically reconstructs the original data.

In addition to CIS, two other data customers use the satellite channel. IBM uses the link to transmit field engineering data at 150 bit/sec from Hawaii to a 2740 terminal in New York, according to CIS.

Communications

And Castle and Cook uses two 75 bit/sec TTY links to transmit data to the mainland.

ITT now uses about 30 satellite channels for Pacific service, according to a spokesman. The channels are made available to ITT and other international carriers by Comsat, which operates the international satellite network.

IBM Tells PBX Group It Favors Liberal Tariff Connections

NEW YORK – IBM has told an FCC interconnection study committee that it favors more liberal tariff provisions to allow "connection of customer-provided equipment to the public [telephone] network."

"We believe that a number of proposed procedures relating to the direct attachment of customer-provided equipment . . . are unnecessary or overly involved," IBM said.

In the past, IBM has avoided direct statements relating to communications issues pending before the FCC, but the company now plans to take an active part in the work of the PBX study committee, an IBM spokesman said.

The IBM statement was sent to Robert Sims, chairman of the Procedures and Enforcement Subcommittee that is formulating standards for certification of customer-provided equipment. Although the study group is working on standards for PBX equipment, it is expected that the same procedures will be later applied to modems and other data communications equipment.

The IBM paper, presented by Fred W. Warden, director of data communications, called for three certification alternatives, including self-certification of customer-provided data equipment by any supplier (carrier or non-carrier); certification by approved independent testing laboratories; and the right of existing carriers to prove to the FCC that certified customer-provided devices fail to comply with "applicable specifications."

Computer Users' Forum & Exposition

The National Computer Conference That's Coming To You

The Need

The computer age is moving into a new stage. Until now, computer makers have dominated the scene, introducing one breakthrough after another in the state of the art. The time has come to pause and consider the computer user. You need more opportunity to improve on the systems you now have.

The Solution

A Computer Users' Forum, run by professionals and designed to bring regional users together in manageable groups to discuss mutual EDP problems with other users, and with regional and national experts . . . and a chance to study and evaluate new equipment and services that will be shown in the presentations of leading EDP suppliers comprising the Exposition.

The Format

Each Day 9:00-9:40 Keynote address by a nationally known expert – an independent, not a vendor – on the day's main subject. Sets the stage for discussions.

9:40-10:30 Panel discussion led by regional experts chosen for their progressive management principles. Questions encouraged.

10:40-11:45 Workshops – panel members conduct separate workshops. Your specific questions fielded, worked out.

12:15-1:30 Conference luncheon – keynote speaker summarizes chief points covered during panels and workshops.

1:00-9:00 Exhibits open, stay open til 9. Exhibitors will show the latest in hardware, software, services.

The Subjects

First Day: Data Entry

Keynote speaker; Lawrence Feidelman, President, Management Information Corp., Cherry Hill, N.J.; Editor, *Data Entry Today.*

Panels and workshops will be grouped by these four subjects:

- Keypunch replacement; key to tape, disc and cassette devices.
- OCR.
- Intelligent terminals – distributed processing.
- Direct data entry/source data automation.

Second Day: Data Communications: The Choices

Keynote speaker; Dr. Dixon Doll, Data Communications Consultant, faculty member, Graduate School of Business, Eastern Michigan University.

Panels and workshops will be grouped by these four subjects:

- Communications equipment from mainframe makers and common carriers.
- Communications equipment from independent suppliers.
- Data transmission via private (lines, microwave) networks.
- Data transmission via carriers (lines, microwave).

Third Day: Operational Efficiency

Keynote speaker; Charles Lecht, President, Advanced Computer Techniques, N.Y., N.Y.; author of *Managing Computer Programming.*

Panels and workshops will be grouped by these four subjects:

- Core extensions.
- System/utility software modifications.
- Independent peripheral usage.
- Dedicated systems vs. general purpose computers.

Panel Members & Workshop Leaders

The regional experts who will run the panels and workshops have been chosen from a wide range of firms and institutions. Some will participate in more than one session, depending on their experience and expertise.

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City	Location	Dates
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☐ New York	Americana	Feb. 29-Mar. 2
☐ Washington, D.C.	Washington Hilton	Mar. 7-9
☐ Atlanta	Regency Hyatt House	Mar. 14-16
☐ Dallas	Market Hall	Mar. 21-23
☐ Los Angeles	Ambassador	Apr. 4-6
☐ San Francisco	Fairmont	Apr. 10-12*
☐ Chicago	Palmer House	Apr. 18-20
☐ Detroit	Cobo Hall	Apr. 25-27

**Monday-Wednesday Schedule*

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That's the way Albert Elias, superintendent of the Yardville Youth Reception and Correction Center, describes the aims of a pioneering program in data processing education being given here.

The project, now in its second full year, was initiated by the Manpower Development and Training Office of the New Jersey Department of Education and is federally funded.

The project includes a fully developed curriculum, a full-time staff of instructors and an IBM 1130 dedicated solely to teaching.

The training is divided into three phases, each progressively more difficult, in which inmates advance through keypunching, computer operations and computer programming. Each phase lasts four months and provides 420 hours of classroom and laboratory instruction.

During the first year of the program, 60 inmates started the course.

At the completion of the first phase, 20 were graduated with keypunching and basic accounting machine skills. The remaining 40 completed courses in computer operations and advanced accounting machine principles. Twenty graduated from this phase and were qualified for computer operator positions. The remaining 20 went on through the third phase and learned computer programming.

...And Analysts Add to Portfolio

KANSAS CITY – "The security analyst's traditional slide rule is going the way of the abacus," said William A. Reasoner, president and chief executive officer of Waddell & Reed, Inc., Kansas City-based national financial services complex. "Computers are a vital part of any mutual fund portfolio – the machines, not the stocks," he added.

Waddell & Reed manages and sponsors the United Funds, Inc. and United Continental group of mutual funds, with assets of approximately $2.6 billion and more than 500,000 shareholder accounts.

"Computers are truly a valuable management tool, enabling mutual fund portfolio managers and analysts to employ management science techniques to implement actual decision-making processes," observed Reasoner.

Management information, portfolio performance measurement and analysis, plus stock selection, are several areas where DP is expanding.

Reasoner noted that mutual fund analysts can use the computer in connection with two familiar but basic approaches: technical analysis and fundamental analysis.

Technical analysis pulls together what analysts know or think about a stock. The fundamental analysts, in the past, used a slide rule and a desk calculator to evaluate companies and industries. The computer speeds up this process and expands the variables which the analysts now are able to consider.

"The financial services industry is just beginning to utilize and realize the potential of the computer. Everyone has the basic data involved in security analysis and financial planning. It is what you do with it – that is truly the name of the game," Reasoner concluded.

19 Calif. Colleges Get T/S System

LOS ANGELES – The initiation of a time-sharing computer system for use at all 19 of the California state colleges will permit students and faculty members engaged in computer projects on any of the campuses to acquire instant access to a central computer facility.

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The system, whose central facility is at San Fernando Valley State College, will provide an interactive computer capability allowing users to solve problems in many applications.

If desired, according to John Harrison, director of information systems, two hypothetical students could instanteneously exchange the computer programs each used within the central computer.

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The single way to store 100,000,000 bytes. The 7330 Disk Drive from ITEL.

Now there's a single-spindle storage subsystem for massive data bases up to 100 million bytes: the new ITEL 7330 Disk Drive. Using standard IBM 3336 disk packs, the ITEL 7330 increases storage capacity more than three times over previous models to 800 million bytes for an 8-drive subsystem. It's plug-to-plug compatible with IBM System/370. And it's quick on the draw; average access time is just 27 milliseconds.

The ITEL 7330 provides the high-capacity storage needed for management information systems, teleprocessing, multiprocessing and time-sharing systems. It offers a number of advantages over its IBM counterpart and other disk storage units. Each 7330 has a single spindle, so you can specify from 1 to 8 drives under one controller for maximum flexibility. The unit has a waist-high slide-back cover, for quick and easy disk change. All internal components are easily accessible. And its compact size means substantial savings in floor space. Reliability is insured through absolute air filtration, disk pack brushes, electromagnetic actuators and closed-loop optical servo positioning.

The ITEL 7330 is the latest in a line of advanced disk storage drives from the Information Storage Systems Division of ITEL. More than 3000 ISS disk drives are working today, proving themselves to be the industry standard for reliability.

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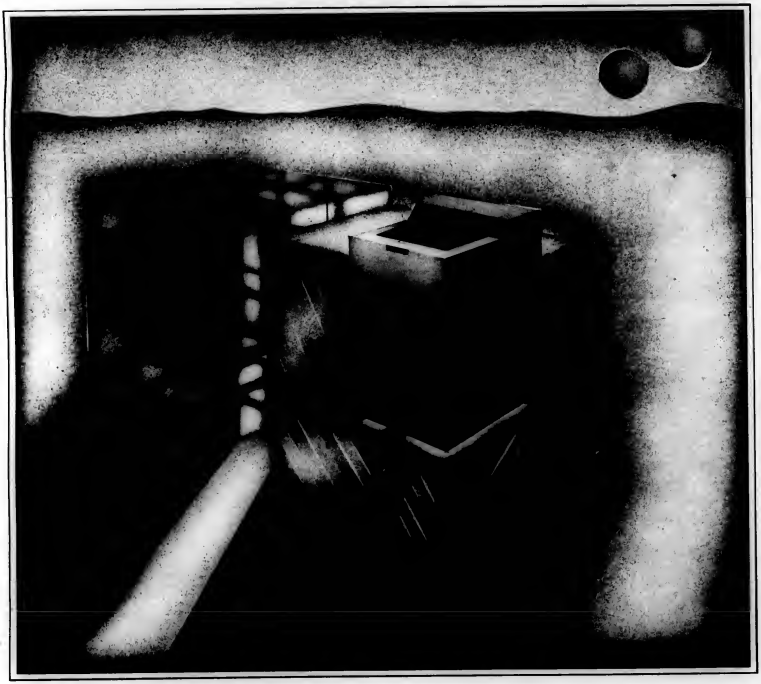

computer industry

a Computerworld news section about the nation's fastest growing industry

February 2, 1972

CI Notes

Itel, Telex Sign Disk Pact

SAN FRANCISCO – Itel will supply 3330-type disk drives to Telex Corp. on a non-exclusive basis under an agreement signed by the two firms last week.

The units will be manufactured by Itel's Information Storage Systems subsidiary, which previously provided 2314-like and double density disk drives to Telex on an exclusive basis.

Itel said the pact could have a value as high as $25 million over the next few years although Telex was not committed to any minimum number of purchases. Itel also said it hoped that the contract would be the first of "several" OEM agreements for the product.

Hitachi Concentrates on Minis

TOKYO – Hitachi, Ltd. will concentrate on the development of minicomputers while continuing development on a line of new generation computers, Japanese sources reported last week.

Hitachi is particularly worried about inroads made into the Japanese mini market by U.S. firms – particularly DEC, Burroughs and IBM's System 3, the sources said.

According to Japanese figures, foreign models of minis grabbed a 24.1% share of the small computer market by the spring of 1971, up from a 3.9% share at the end of March 1970.

Process Control to Double

NEW YORK – The process control market, which grew from $620 million in 1963 to $1.2 billion in 1970, will double to $2.4 billion by 1980, according to Frost and Sullivan.

"The ratio of process control equipment expenditures to new plant and equipment expenditures will continue to increase during the 1970s as capital spending itself accelerates," the firm said.

Supershorts

Entrex, Inc., booked $2.3 million purchased value of Entrex 480 systems in 1971, with 20 systems sold to 18 customers. The company projects sales of over 100 systems in 1972.

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University Computing Co. is consolidating all of its computing service operations in the U.S. into a new business organization – UCC's Computer Utility Group.

– – –

Data General Corp. has delivered its 2,000th small computer, a Nova 800, to the New London Laboratory of the Naval Underwater Systems Center. Date General delivered its first Nova computer in February 1969, and delivered its 1,000th Nova in March 1971.

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Data 100 Corp. may change its method of accounting for sales of equipment to a third-party leasing company. The revision, if adopted, would have the effect of spreading revenues and certain costs over a period of years. The change would thereby substantially reduce revenues and increase losses in 1971.

Independent Joins Battle

Telex Suit Asks IBM Breakup, Damages

By E. Drake Lundell Jr.
Of the CW Staff

TULSA, Okla. – Independent peripheral makers are now represented in the antitrust actions against IBM.

Telex Corp. has filed a suit in U.S. District Court here calling for the breakup of IBM "as a single entity monopolizing and controlling the electronic data processing industry."

The suit also asks for damages amounting to around $877 million.

In a statement, IBM said: "We have reviewed Telex's allegations, deny them, and are prepared to defend against them in court."

Damages Sought

In the suit, Telex seeks damages of $238.3 million for being deprived of the right to compete for a share of the peripheral equipment market and an additional $54 million in damages for reduction of revenues, allegedly caused by disk drive price cuts.

The firm requested the court to treble actual damages.

"Some of the specific acts and practices of IBM which have been for the purpose of destroying and eliminating Telex as a viable competitor in the IBM peripheral replacement marketplace are as follows:

"On Dec. 14, 1970," the suit says, "IBM without technological change and without changing or altering performance of its direct access disk storage devices gave such devices different model numbers and drastically reduced the prices, undercutting the prices then charged by Telex for the Telex replacements.

"On May 27, 1971, IBM announced additional price cuts for its direct access disk storage devices . . . by giving discounts not theretofore available for one- and two-year leases. The effect of such discounts was to lock Telex out of the available market by tying up the customer for up to two years and drastically undercutting the prices then charged by Telex for the Telex replacement for IBM peripherals."

Telex says IBM raised its prices on mainframes and some peripheral equipment soon after it had reduced the prices on the disk systems and that these price increases were only on equipment "for which Telex did not offer competitive devices."

Telex requests that the court "decree that the defendant, IBM, both directly and through combination and conspiracy, has monopolized and attempted to monopolize the interstate and foreign electronic data processing markets, including the submarket for peripheral devices."

In addition, it asks the court to "issue a permanent injunction restraining IBM . . . for engaging in activities which violate the antitrust laws . . . and specifically from engaging in predatory action which would tend to destroy and eliminate Telex as a competitive entity . . .

"In this regard, the court should enjoin and restrain IBM from entering into agreements with its customers whereby IBM offers incentives to the customer for long-term or fixed-term leases for IBM's peripheral equipment and should further enjoin and restrain IBM for penalizing in any way its customers who terminate an IBM fixed-term lease plan."

In addition, the suit asks the court to issue an order calling for the "dissolution of IBM as a single entity . . . . The court should order the divestiture of IBM to the extent that a viable competitive electronic data processing industry may be created."

With the entry of Telex into the antitrust fray, all sides of the computer industry have called for the breakup of the industry giant.

Control Data is pressing its suit from the mainframe side, as is Greyhound Computer from the leasing angle. Software firms were represented in antitrust action by Applied Data Research and Programmatics, but those suits have been settled out of court.

Caravan Exhibitors Cite Area Coverage, End-User Market

NEWTON, Mass. – "The Computer Caravan should increase our exposure in end-user markets," according to one of the firms planning to exhibit in the traveling Computer Users' Forum and Exposition sponsored by *Computerworld*.

R.C. Mehlenbacher of Ferroxcube said his firm has been active in the OEM market in the past, but in the last six months had decided to enter into the end-user market.

In addition, Mehlenbacher said the show, by traveling to nine different cities in 10 weeks, would "bring us broader coverage than a larger show that was limited to one location."

Wide Distribution

"The Caravan offers the ideal opportunity to reach between 80% to 85% of the prime marketing area for Lockheed's new SUE minicomputer in a very short time," according to Gene Sylvester of Lockheed Electronics Corp.

"The dates coincided with our first half-year promotion program," he added.

The convenience of the Caravan was also cited as a reason for displaying by several of the firms that will make the trip.

Under the plan, all the logistics of transporting the displays and exhibitor equipment will be handled by CW. In each of the nine cities the exhibitor is just responsible for having a man on hand to answer users' technical questions.

The sponsor's "handling of all transportation" is a definite plus, in the eyes of Robert Smith of Data 100, who said "we're looking for people to see our equipment at the show and become interested."

Computer Automation Offers Card, Tape Systems

NEWPORT BEACH, Calif. – Computer Automation, Inc. has a variety of magnetic tape systems and a card reader system as peripheral options for its 8- and 16-bit Naked Mini and Alpha minicomputers. The tape systems may also be used with the company's 116 and 216 minis.

The mag tape systems include a 4-tape-deck interface, cable, software and PEC

New OEM Products

rack-mountable tape transport with densities of 556 and 800 bit/in., either 7- or 9-track.

The Model 18224-10 uses the PEC 7820 and sells for $7,000; the 18224-20 incorporating the PEC 7840 drive is priced at $7,600; the 18224-30 sells for $8,900 including the PEC 6860 transport; and the 18224-40, incorporating the PEC 6840 drive, is priced at $9,400.

The card system includes a Bridge 8000, 300 card/min reader and interface controller which plugs into a prewired slot in the minis. It sells for $3,850.

The company's price structure enables the customer to economize by buying the peripheral from the manufacturer for drop/shipment to Computer Automation for checkout with the computer and interface.

The firm is at 895 W. 16th St., 92660.

Comstar Adds Printer to Line

MINNEAPOLIS, Minn. – The Concept 30 printer unit has been added by the Comstar Corp. to its line of minicomputer peripherals.

The printer features three different plug-in internal I/O controller boards (parallel, serial, or bisynchronous) to tie the unit to either a mini or a modem.

Weighing 83 lbs, the printer is adjustable from 13- to 132-char./line and can print at 30 char/sec. Six-part paper from 3- to 14-7/8 in. wide can be used in the tractor feed.

The device is available in RO, KSR and ASR configurations with quantity prices starting at $1,360 from 7413 Washington Ave. South, 55435.

Novas Get Multiplexer System

SOUTHBORO, Mass. – From four to 64 communications lines can be handled by a communications multiplexer system recently introduced by Data General for its Nova series of minicomputers.

The system is made up of standard 15 in.-square PC cards, each containing character assembly, disassembly and buffering hardware for four lines.

The cards can be customized for speeds to 9,600 bit/sec, and 6- to 8-bit characters with 1- or 2-bit stop code, or 5-bit characters with 1-1/2 bit stop code by moving wires. The cards are initially set for 110 bit/sec 11-bit code.

Cards are available to interface to Teletype terminals or to RS232-compatible lines, and can be ordered with connectors for direct connection of terminals or manual answer modems, or with connectors for standard teletypewriter or modem junction panels.

Each card costs $1,500.

Other New Products

OEM data sets, equivalent to Bell 113A and B sets, the 7113A and B, are available from Teledynamics Division of Ambac Industries, Inc., Fort Washington, Pa.

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The SG-103 Modem Tester from Novation, Inc., Tarzana, Calif., provides calibrated test signals and parameter measurements for all acoustic and DAA 101-, 103- and 113-compatible modems.

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Advanced Magnetic Products, Inc., Glendale, Calif., has introduced the Mag-Pen that reads magnetically coded sales slips, tags and cards.

– – –

An industrial enclosure that meets Nema 12 specs and protects components from temperature, oil and contaminants, is available from DEC.

– – –

The Series 8 and 8F compact tape transports from Willard Laboratories, Los Angeles, offer double the tape capacity of prior models.

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Computer Labs, Greensboro, N.C., has developed the CLM 810-1 buffer memory capable of accepting 8-bit words at write rates from dc through 10 MHz.

– – –

Anderson Jacobson, Sunnyvale, Calif., has introduced the AL 700 digital cassette deck, for the OEM, to replace paper tape devices.

– – –

An expandable MOS memory module of 24K-bit capacity and read/write data rates from 400 Hz to 5 MHz has been announced by Dest Data Corp., Sunnyvale, Calif.

– – –

The Model 816 infinitely variable Mini-Rom from Quadri Corp., Phoenix, Ariz., is intended for applications requiring a small non-volatile, NDRO store.

– – –

The Peripheral Equipment division of Pertec Corp. has announced a disk formatter for its 5000 Series disk drives that simplifies interface design. The Los Angeles company also introduced a buffered mag tape system for minicomputers.

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The 1700 Series Magnetic Tape transports from Kennedy Co., Altadena, Calif., provides the interfacing simplicity of an asynchronous incremental recorder at the data rate of a continuous recorder.

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Datapac, Inc., Santa Ana, Calif., has announced a 16K braided-wire ROM intended for microprogramming in minicomputers.

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The 122 Non-Typing Bit Parallel Perforator from Kleinschmidt, Deerfield, Ill., detects tape malfunctions through punch confirmation and tape motion alarms.

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The R-1500 automatic memory core handler from Computer Test Corp., Cherry Hill, N.J., is designed to lower memory production costs.

– – –

Solitron Devices, Inc., San Diego, Calif., has introduced the 4608 Bit Static MOS Keyboard Encoder that features 128 coded key capability.

– – –

The Series 790 Data Buffer from Hill Enterprises, Ridgecrest, Calif., samples and stores input data in digital form for transmission at a different rate.

Proprietary Software--Part II

Suppliers Should Anticipate Maintenance Costs

By Martin A. Goetz
Special to Computerworld

The business of developing and marketing proprietary software products is at least as complex as the business of selling computer hardware and requires a great deal of financial and personnel resources. There are several marketing considerations that clearly reflect the true nature of proprietary software products.

First, anticipate continuous development and expenditure.

It would be a regrettable mistake to expect that once a proprietary product is operational, investment requirements end. The experience of several major, successful software companies verifies that extensive programming costs are likely to be incurred throughout the life of a product. Reasons for additional costs may be that:

- Enhancements to the product may be required to keep the product competitive.
- Changes may be required to expand or modify the product because of inherent shortcomings.
- User requirements may have changed.

Generally, a manufacturer should expect to invest at least an additional 200% of initial development costs during product life. For example, if it is estimated that a package can be brought to market for $100,000, the anticipated total cost for that package should be approximately $300,000.

Sell the product.

Manufacturers should beware of the misconception that a software product can sell itself. A software company must be prepared to develop and support a thorough and effective marketing campaign to "sell" each of its packages to the public.

This requires sales brochures, trained salesmen, market analysis, performance specifications and user literature. These marketing tools and their accompanying costs are a prerequisite for creating a "viable" software product. In fact, one reliable measure of the potential success of any software product is the amount of resources allocated for effective marketing.

Provide technical support.

The success of a package also depends on the technical support provided. Customers want and demand service, and they are willing to pay for it. The guarantee of product maintenance, personnel training and system installation support are much more than impressive sales claims.

Fulfilling these guarantees will assure that a package will be used, that the satisfied customer will be available as a solid reference, and that he will be receptive to buying other packages from the same organization.

Choose an effective pricing strategy.

Pricing is the ultimate key to the financial success of a product. Several sound pricing strategies have already been developed which are dependent upon:

- The financial strength of the developer.
- The amount of competition and degree of competitive pricing.
- The value of the product to the user.
- The expected life of the product.
- The type of product.

The following are some specific pricing strategies which have been used in selling proprietary software. The terms "lease" and "license" are used interchangeably to mean restricted usage by the buyer without ownership.

Plan 1: Free trial. No commitment is required on the part of the user.

Plan 2: Monthly payment. This agreement to pay on a monthly basis can be cancelled at any time.

Plan 3: Three-month minimum, followed by monthly payments. This plan is similar to the above monthly plan, except that a three-month minimum lease (or license) is required. This was IBM's original standard policy for program products which has recently been changed to Plan 2.

Plan 4: Long-term lease. From one to three years is the general standard for long-term leasing of many software products produced by independent software companies.

Plan 5: Permanent license. Under this agreement, the buyer can use a package indefinitely. Unfortunately, it is too frequently easy for a vendor to "hit and run" -- that is, to arrange for permanent use, but then fail to support the program. Thus, a user must be assured of receiving the source code, should the vendor refuse to maintain his package. Most companies concurrently offer separate maintenance contracts.

Plan 6: Monthly rental convertible to a permanent license. In effect, this is a combination of Plans 2 and 5.

Plan 7: Metered usage. This plan is similar to a concept originally utilized by Xerox and IBM. An internal meter is one of the factors that determines the cost of a package to an individual user. Although a relatively new concept for proprietary software, it is currently being used on an experimental basis by several different companies.

Plan 8: Payment based on "savings to the user." Since such payment is extremely difficult to calculate and enforce, this type of pricing probably will disappear rapidly. Although it is being promoted by a few companies at this time, this approach gives an overall impression of being a short-lived sales gimmick, rather than a serious pricing innovation.

Obviously, a wide variety of pricing strategies are already being used. In today's economy, costs and pricing plans are particularly critical to a software package buyer. The alert software manufacturer should be continually reappraising his pricing policies in light of changing economic and market trends.

Martin A. Goetz is vice-president at Applied Data Research Inc.

Arts III on Schedule

WASHINGTON, D.C. – Delivery and installation of the computer-aided Automated Radar Terminal System (Arts III) is proceeding on schedule, according to Univac, prime contractor on the Federal Aviation Administration's terminal air traffic control systems.

Arts III is scheduled for 61 of the nation's busiest airports. Fifteen Arts III systems have been installed, and an additional 22 are scheduled to be accepted by the FAA by July 1972.

Recognition Equipment Turns Profit

DALLAS — Recognition Equipment Corp. managed to rebound from its 1970 loss of $10.9 million by registering earnings of $487,000 or about 10 cents per share for the year ended Oct. 31.

Revenues reached $38.9 million up from $34.7 million in 1970. The 1970 loss was attributable to an accounting change and other extraordinary items, the company said.

Earnings were reduced by inventory writedowns, the establishment of reserves against possible future losses on inventory, and expensing company-supported research and development costs, President Herman L. Philipson Jr. noted.

The backlog of contracts in October was $15.5 million, up slightly from $14.4 million a year earlier, but down from the July backlog of $17.9 million. The backlog does not include postal automation contracts with the U.S. Postal Service and the Postal and Telecommunications Ministry of France, he said.

And Corporation S, an affiliate of Recognition Equipment, reduced its losses. In the year ended Oct. 31, the firm, which operates Optimation centers offering optical character recognition and other data input facilities, reported a loss of $4.6 million, compared with a restated loss of about $6.5 million in 1970. Revenues were $1.3 million, compared with $1.4 million in 1970.

The figures for both years reflect a change in accounting to the equity method.

Corporation S reduced by 21% the 1970 operating loss and witnessed a 30% rise in revenues in the second six months compared with the first half of 1971, according to President Don W. Hartson.

Noting that new business received during the last quarter of fiscal 1971 was at a record high, Hartson said: "Corporation S appears in a favorable posture from which a positive cash flow position, from an overall corporate standpoint, may be reached during the new fiscal year."

Graham Magnetics Posts New Highs

GRAHAM, Texas – Graham Magnetics Inc. posted new highs in the first six months of its present fiscal year, with revenues reaching $4.4 million, a gain of 15% over the $3.9 million recorded in the similar period last year.

In the six months ended Dec. 31, income from operations, before taxes and extraordinary items, rose by 41% to $568,491 from $404,022 in the same period last year.

Earnings Rise

Despite increased tax payments resulting from a smaller remaining tax loss carryforward, earnings rose to $488,491, compared with $477,652 in the similar period last year.

Per share earnings were 67 cents compared with 72 cents in the first half of 1970. The firm reported raising $3 million in additional financing through the sale of common shares in November.

The tape maker recorded sales of over $1 million in one month, December, marking a first for the company, according to Graham President G.A. Jaggers.

Acquisitions

Data Service Corp. has acquired Nashville Computer Service from United Data Centers, Inc.

Computer Dynamics Inc., Oakland, Calif., has agreed to purchase Pacific Data Services.

National Information Systems Corp. has acquired Computer Investments and Leasing Corp., a facilities management firm. The transaction involved an exchange of stock.

University Computing Co. (UCC) has agreed to acquire Results, Inc., for 140,000 shares of common stock. Results Inc. specializes in software for the banking industry.

United Data Centers has acquired Dynafacts, Inc., a Kansas-based data center network.

Correction

Financial Data Systems, Inc. [CW, Dec. 8] has been purchased from Continental Telephone Corp. of Missouri.

New Registrations

AUTEX, INC., 55 William St., Wellesley, Mass., operators of a Nashua computer system, filed to register 269,234 shares of common, at $18 per share maximum. The underwriter is F.S. Smithers and Co., Inc., 45 Wall St., New York, N.Y., 10005

SYSTEMS ENGINEERING LABORATORIES, INC., 6901 W. Sunrise Blvd., Fort Lauderdale, Fla., digital computer and peripheral equipment manufacturer, filed to register 173,578 shares of common, at $8.25 per share maximum.

RIKER-MAXSON CORP., 280 Park Ave., New York, N.Y., designer and manufacturer of electronic components for the communications industry, filed to register $7.5 million of convertible subordinated debentures, due 1992. Proceeds to be used to reduce debts and for working capital. The underwriter is Bear, Stearns & Co., One Wall St., New York, N.Y., 10005.

WAVETEK, 9045 Balboa Ave., San Diego, Calif., designers and manufacturers of electronic test equipment and data communications equipment, filed to register 200,000 shares of common. Proceeds, at $10 per share maximum, to be used to finance installment sales and leases of equipment, and for working capital. The underwriter is Hambrecht & Quist, 235 Montgomery St., San Francisco, Calif., 94104.

CALIFORNIA COMPUTER PRODUCTS, INC., 2411 W. La Palma Ave., Anaheim, Calif., a peripheral equipment firm, filed to register $10 million of convertible subordinated debentures, due 1992. Proceeds to be used to reduce short-term bank debts. The underwriter is A.G. Becker & Co., Inc., 1901 Building, Century City, Los Angeles, Calif.

MEASUREX CORP., 330 Mathaw St., Santa Clara, Calif., designer and manufacturer of digital computer process control systems, filed to register 600,000 shares of common. Proceeds, at $20 per share maximum, to be used to retire a subordinated note and for working capital. The underwriter is Eastman Dillon, Union Securities & Co., Inc., One Chase Manhattan Plaza, New York, N.Y., 10005.

DATA GENERAL CORP., Route 9, Southboro, Mass., digital computer manufacturer, filed to register 60,000 shares of common, at $60 per share maximum.

TRADE*QUOTES

Computerworld Stock Trading Summary

All statistics compiled, computed and formatted by TRADE*QUOTES, INC. Cambridge, Mass. 02138

CLOSING PRICES THURSDAY, JANUARY 27, 1972

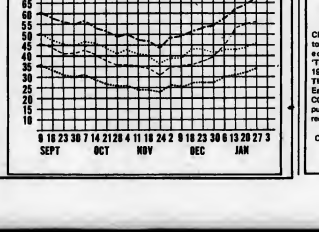
EXCH		71-72 RANGE	CLOSE JAN 27	WEEK NET CHNGE	WEEK PCT CHNGE
		(1)	1972		
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 4	1 1/8	- 1/8	-10.0
A	APPLIED DATA RES.	5- 13	6 1/4	- 1/8	-1.9
A	APPLIED LOGIC	1- 5	3	+ 3/4	+27.2
H	AUTOMATIC DATA PROC	44- 82	81 1/2	+1 1/2	+1.8
O	AUTO SCIENCES	1- 8	5/8	+ 3/8	+25.0
O	COMPUTER NETWORK	2- 11	7 1/4	0	0.0
O	COMPUTER PROPERTY	5- 11	3	-1 1/2	-23.0
N	COMPUTER SCIENCES	6- 17	9 3/4	+1 1/8	+13.0
O	COMPUTER TECHNOLOGY	4- 11	6 5/8	+ 1/2	+8.1
O	COMPUTER USAGE	5- 10	9 7/8	- 7/8	-8.1
O	COMP AUTOMAT REPORTS	6- 13	8 1/4	- 1/4	-2.7
N	COMPUTING & SOFTWARE	17- 45	25 3/4	+1 3/4	+7.2
O	COMRESS	1- 4	2 1/8	- 1/8	-5.5
O	COMSHARE	4- 8	6 1/8	+ 5/8	+11.5
O	DATA AUTOMATION	1- 4	3/4	+ 1/4	+50.0
O	DATA PACKAGING	6- 10	6 5/8	+ 1/4	+4.0
O	DATANATION SERVICE	1- 3	3/4	0	0.0
L	DATATAB	4- 10	5 7/8	- 3/4	-11.3
O	EOP RESOURCES	5- 16	6 1/4	- 3/8	-5.6
A	ELECT COMP PROD	2- 9	5 1/4	+ 1/4	+8.3
O	ELECTRONIC DATA SYS.	14- 85	52 5/8	+3 7/8	+8.8
O	INFORMATICS	6- 15	10 5/8	+1	+10.3
O	I.D.A. DATA CORP	1- 3	1 1/8	0	0.0
A	ITEL	7- 23	11 3/4	+1 1/2	+14.6
O	KEANE ASSOCIATES	4- 14	0 1/2	0	0.0
O	KEYDATA CORP	5- 14	0	0	0.0
O	MANAGEMENT DATA	1- 11	7	+ 3/4	+12.0
O	NATIONAL CSS INC	7- 14	11	- 1/4	-2.2
O	NAT COMP ANALYSTS	1- 4	3/4	0	0.0
P	ON LINE SYSTEMS INC	7- 18	8 7/8	- 1/4	-2.7
N	PLANNING RESEARCH	10- 26	16 5/8	+2 3/4	+19.6
O	PROGRAMMING METHODS	19- 29	23	+ 1/4	+1.0
O	PROGRAMMING & SYS	1- 4	1 7/8	0	0.0
O	SCIENTIFIC COMPUTERS	2- 4	3 5/8	- 3/8	-9.3
O	SIMPLICITY COMPUTER	1- 4	1 1/8	- 1/4	-18.1
O	SOFTWARE SYSTEMS	1- 3	1 1/2	0	0.0
O	TOS COMPUTER CENTERS	4- 9	4 1/2	- 1/8	-2.7
O	TOLLEY INTL CORP	3- 9	7	- 1/4	-3.4
O	TRACOR COMPUTING	2- 5	2 1/8	- 1/4	-10.5
O	TYMSHARE INC	1- 15	2 1/8	- 1/8	-5.5
O	UNITED DATA CENTER	3- 7	6 1/4	0	0.0
N	UNIVERSITY COMPUTING	14- 38	22 1/2	+3 1/4	+16.8
A	URS SYSTEMS	5- 11	7 3/8	+ 7/8	+13.4
O	VORTEX CORP	5- 11	6 1/2	+ 1/2	+11.7
	PERIPHERALS & SUBSYSTEMS				
N	ADDRESSOGRAPH-MULT	24- 48	38	+ 5/8	+1.6
O	ALPHANUMERIC	1- 6	1	+ 1/8	+14.2
N	AMPEX CORP	10- 25	11 1/4	+ 1/8	+1.1
O	ANDERSON JACOBSON	5- 10	7 1/2	0	0.0
O	ATLANTIC TECHNOLOGY	3- 8	5 3/4	+ 1/4	+4.5
A	BOLT,BERANEK & NEW	4- 8	5 7/8	+ 1/2	+9.0
N	BUNKER-RAMO	6- 17	9 7/8	- 1/4	-2.4
A	CALCOMP	14- 33	23 1/2	+2 7/8	+13.9
O	COGNITRONICS	2- 8	3	+ 1/4	+9.0
O	COLORADO INSTRUMENTS	2- 8	2 3/8	+ 1/8	+5.5
O	COMPUTER COMMUN.	2- 19	7/8	- 1/8	-12.5
A	COMPUTER EQUIPMENT	3- 7	4	+ 3/8	+10.5
A	COMPUTEST	4- 20	8 1/2	+1 5/8	+23.6
O	CONSOL COMPUTER LTD.	1- 12	5/8	+ 1/8	+25.0
A	DATA PRODUCTS CORP	5- 10	7	+ 1/4	+3.4
O	DATA RECOGNITION	3- 8	4 1/4	- 1/4	-5.5
O	DATA TECHNOLOGY	5- 9	7 7/8	- 1/8	-1.6
O	DIGITRONICS	2- 8	3 1/8	- 1/8	-3.8
N	ELECTRONIC M A M	5- 16	8	+1 3/8	+20.7
O	FABRI-TEK	2- 6	3 1/4	- 5/8	-16.1
O	GENERAL COMPUTER SYS	1- 10	2	- 1/2	-19.2
N	GENERAL ELECTRIC	53-124	62 3/8	- 7/8	-1.3
O	INFOREX INC	17- 49	34 1/2	+3 1/4	+10.5
O	INFORMATION DISPLAYS	3- 8	4 1/4	0	0.0
O	MANAGEMENT ASSIST	1- 2	7/8	0	0.0
A	MARSHALL INDUSTRIES	7- 27	11 7/8	+1 3/4	+17.2
N	MEMOREX	20- 78	39 7/8	+5 7/8	+18.9
A	MILGO ELECTRONICS	12- 26	23 3/4	+3 1/4	+15.8
N	MOHAWK DATA SCI	15- 47	34 3/4	+2 3/8	+12.5
O	OPTICAL SCANNING	6- 18	7 7/8	- 5/8	-7.3
O	PHOTON	6- 12	9	- 5/8	-6.4
A	POTTER INSTRUMENT	11- 25	18 5/8	+ 5/8	+3.4
O	PRECISION INST.	2- 16	3	+ 1/8	+2.5
O	RECOGNITION EQUIP	9- 26	14 3/8	+2 3/8	+19.7
O	REDCOR CORP.	5- 9	7 1/8	0	0.0
N	SANDERS ASSOCIATES	9- 22	18 1/4	+1 7/8	+11.4
O	SCAN DATA	6- 13	11 3/8	+ 5/8	+5.8
O	TALLY CORP.	6- 18	11 5/8	+ 1/8	+1.0
N	TELEX	8- 22	14 5/8	+1 1/4	+9.3
	SUPPLIES & ACCESSORIES				
N	ADAMS-MILLIS CORP	9- 19	11 3/4	- 1/2	-4.0
O	BALTIMORE GUS FORMS	6- 10	7 1/4	0	0.0
A	BARRY WRIGHT	7- 13	10 7/8	+1 5/8	+17.5
A	DATA DOCUMENTS	14- 28	22	+2 1/8	+10.6
O	OUPLEX PRODUCTS INC	8- 14	13 5/8	0	0.0
N	ENNIS BUS. FORMS	13- 17	17	- 3/8	-4.0
O	GRAHAM MAGNETICS	9- 35	10 3/8	- 3/4	-3.7
O	GRAPHIC CONTROLS	6- 15	12 1/2	+ 1/4	+2.0
N	3M COMPANY	86-135	132 3/4	+1 1/2	+1.1
O	MOORE BUS. FORMS	36- 47	44 3/4	- 1 3/4	-3.7
N	NASHUA CORP	29- 53	52	+ 3/4	+1.4
O	REYNOLDS & REYNOLD	37- 69	68 3/4	+1 1/4	+1.8
O	STANDARD REGISTER	14- 23	18 1/8	+ 1/8	+0.6
O	TAB PRODUCTS CO	8- 17	16	- 1/2	-3.0
N	UARCO	23- 34	26 1/4	-1 1/2	-5.4
A	WAGASH MAGNETICS	5- 10	8 3/4	+1 1/8	+14.7
N	WALLACE EUS FORMS	16- 26	24 3/8	+1	+4.2
	COMPUTER SYSTEMS				
N	BURROUGHS CORP	105-160	151 1/2	+1 7/8	+1.2
N	COLLINS RADIO	10- 20	16 5/8	+1 3/4	+11.7
N	CONTROL DATA CORP	34- 83	55 3/4	+4 1/4	+8.2
O	DATA GENERAL CORP	19- 65	61 1/4	+ 1/4	+0.4
O	DIGITAL COMP CONTROL	4- 24	21 3/4	+ 3/4	+3.5
N	DIGITAL EQUIPMENT	53- 85	84	+4 1/2	+7.8
N	ELECTRONIC ASSOC.	5- 9	7 1/2	+ 7/8	+13.2
A	ELECTRONIC ENGINEER.	5- 10	8 1/4	0	0.0
N	FOXBORO	25- 46	35 3/4	0	0.0
O	GENERAL AUTOMATION	5- 26	23 3/4	+6 1/2	+37.6
N	HEWLETT-PACKARD CO	30- 50	48 3/4	- 1/8	-0.2
N	HONEYWELL INC	85-144	143 7/8	+3 3/8	+2.4
N	IBM	284-360	368 1/4	+4 3/4	+1.3
O	INTEGRATA INC	6- 11	8 5/8	- 1/8	-1.4
N	NCR	25- 48	34 1/8	+3 7/8	+12.8
N	RAYTHEON CO	26- 41	34	+ 1/2	+1.5
N	SPERRY RAND	27- 46	41 7/8	+1 5/8	+3.7
N	SYSTEMS ENG. LABS	7- 18	13 1/4	+1 5/8	+13.9
N	VARIAN ASSOCIATES	11- 18	16 1/4	+ 5/8	+4.0
N	VICTOR COMPTOMETER	13- 27	18	0	0.0
N	WANG LABS.	29- 50	38 3/4	+1 3/8	+3.6
N	XEROX CORP	85-128	127 7/8	+2 7/8	+2.2
	LEASING COMPANIES				
A	BOOTHE COMPUTER	11- 27	15 7/8	+1 3/8	+9.4
A	BRUNSWICK CORP.	2- 4	3 5/8	+ 3/8	+11.5
O	COMPUTER EXCHANGE	1- 8	1 1/2	- 1/4	-14.2
A	COMPUTER INVSTRS GRP	7- 14	10 1/4	+ 1/2	+5.1
O	COPI	8- 19	12 7/8	+1 1/8	+9.5
O	GATRONIC RENTAL	2- 4	2 5/8	0	0.0
A	OCLI INC	3- 13	8 7/8	+ 7/8	+10.8
A	OGARROWN-STORM	12- 25	19 1/4	+ 1/2	+2.7
A	OPA, INC.	4- 9	5 3/8	+ 1/8	+2.3
A	GRAHTE MGT	7- 15	10 1/4	+1 1/4	+14.0
A	GREYHOUND COMPUTER	7- 11	10 1/2	+1 1/2	+16.6
N	LEASCO CORP	16- 26	21 7/8	+ 5/8	+2.9
O	LECTRO MGT INC	1- 5	2 5/8	0	0.0
O	MCC INDUSTRIES	3- 9	3 1/4	- 1/8	-3.7
A	ROCKWOOD COMPUTER	3- 9	4 5/8	+ 1/4	+5.7
O	SYSTEMS CAPITAL	3- 7	3 5/8	+ 3/8	+9.3
O	U.S. LEASING	16- 39	38 1/2	+2 1/4	+6.2

EXCH: N=NEW YORK EXCHANGE; A=AMERICAN EXCHANGE
L=NATIONAL EXCHANGE; O=OVER-THE-COUNTER
P=PHIL-BALT-WASH

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Computer Stocks Trading Index

Computer Systems ----- Software & EDP Services
Peripherals & Subsytems ..... Leasing Companies
Supplies & Accessories ---- CW Composite Index



Earnings Report

ANALYTICAL SYSTEMS
Year Ended Sept. 30

	1971	1970
Shr Ernd (Loss)	$.03	$(.19)
Revenue	602,289	312,105
Earnings (Loss)	11,970	(71,507)

COOEX
Year Ended Sept. 30

	1971	1970
Revenue	$2,533,676	$1,122,547
Loss	1,946,469	2,945,584

COMPUTEST
Three Months Ended Nov. 30

	1971	e1970
Shr Ernd	------	$.22
Revenue	$946,809	3,173,703
Earnings (Loss)	(258,912)	208,297
6 Mo Shr ------		.36
Revenue	2,167,516	5,572,274
Earnings (Loss)	(381,022)	345,789

a-Restated to reflect the acquisition of Integrated Mechanical Systems Inc. on a pooling-of-interests basis.

COMPUTER INVESTORS GROUP
Nine Months Ended Dec. 31

	1971	1970
eShr Ernd	$.61	$.46
Revenue	8,940,615	7,339,199
bDpsc Cred	36,000	$44,000
cEarnings	1,289,964	966,410

a-Based on income before special credit and assumes the exercise of warrants covering 750,000 shares. b-Gain on repurchase of a portion of the company's convertible debentures at less than the principal amount, which includes provision for loss on investment in an affiliate of $135,000. c-Equal to 62 cents a share in 1971 and 48 cents a share in 1970.

REYNOLDS & REYNOLDS
Year Ended Sept. 30

	1971	1970
Shr Ernd	$1.40	$1.49
Revenue	50,947,118	47,477,583
Earnings	4,109,956	3,385,959

CORPORATION S
Year Ended Oct. 31

	1971	e1970
Revenue	$1,328,010	$1,167,006
Spec item	b298,000	c102,000
Loss	4,641,000	6,470,000

a-Restated for accounting procedures. b-Debit; loss from sales of and provision for possible loss on disposition of interest in jointly owned companies. c-Credit; gain from sale of interest in jointly owned companies.

MICROFORM DATA SYSTEMS
Year Ended July 30

	1971	1970
Revenue	$405,044	$139,046
Spec Chg	------	e254,547
Loss	2,634,661	3,038,512

e-Loss on investment in subsidiary.

COMPUOYNE
Year Ended Sept. 30

	1971	1970
Shr Ernd	$.02	$.06
Revenue	$22,337,166	24,516,666
Earnings (Loss)	(1,057,200)	277,844

OASA
Year Ended Oct. 31

	1971	1970
Revenue	$14,650,000	$16,752,000
Spec Chg	------	e19,796,000
Loss	1,398,000	23,249,000

e-Consists of a $17,742,000 write-off of goodwill associated with the acquisition of Cyber-Tronics Inc. in December 1969, and a $2,054,000 loss related to discontinued operations.

Get Epoch 4

and get rich slow.

Epoch 4 computer tape won't make you rich overnight. But it can put real money in your pocket, day after day.

Here's how:

Epoch 4 is 80 times tougher than competitive tapes. And it cuts handling damage by about 50 per cent. So Epoch 4 lasts one heck of a lot longer. Which means extra money in your pocket (or your budget, as the case may be).

As an extra dividend, Epoch 4's headwear rate is just 4 per cent of the industry average.

And if that's not impressive enough, think about this—Epoch 4 is the world's only computer tape with a twenty year warranty.

Sure, Epoch 4 costs a little more to start with. But put the pencil to it. How much is your data worth? What does it cost to recover lost information?

A really great tape just could be the best investment you've ever made.

Quick, see your man from Graham Magnetics about Epoch 4. And start getting rich.

GRAHAM MAGNETICS

GRAHAM, TEXAS 76046